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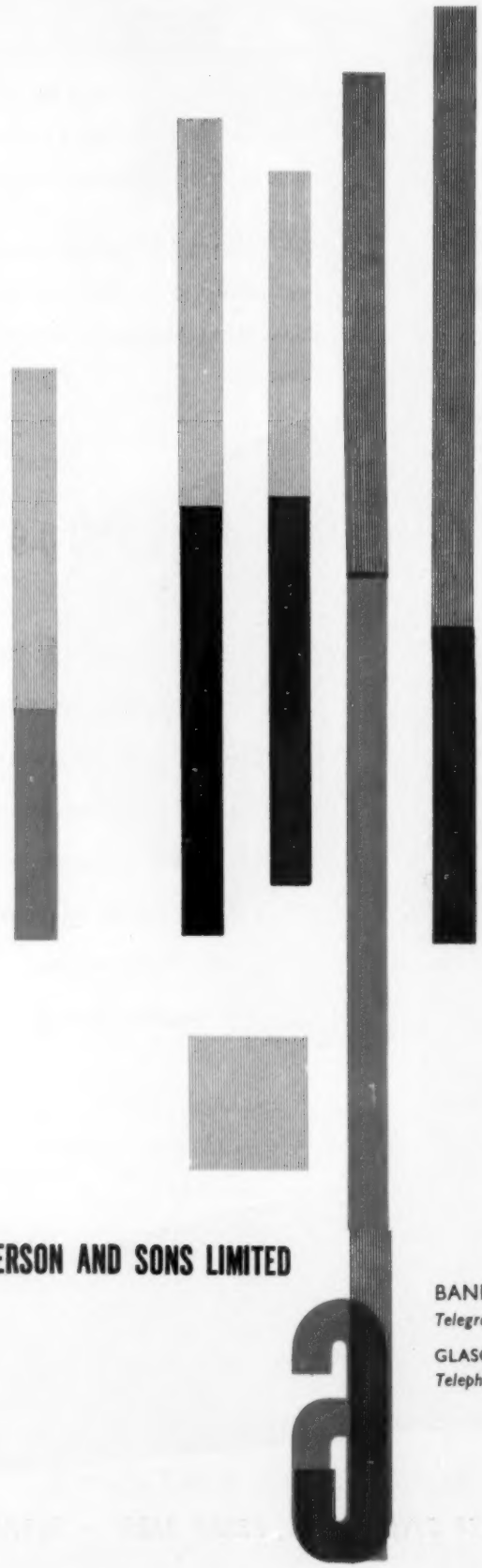

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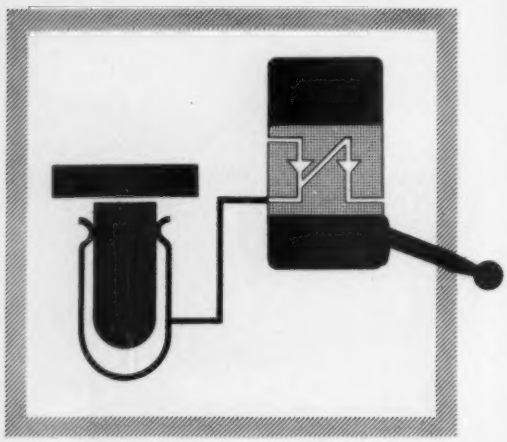

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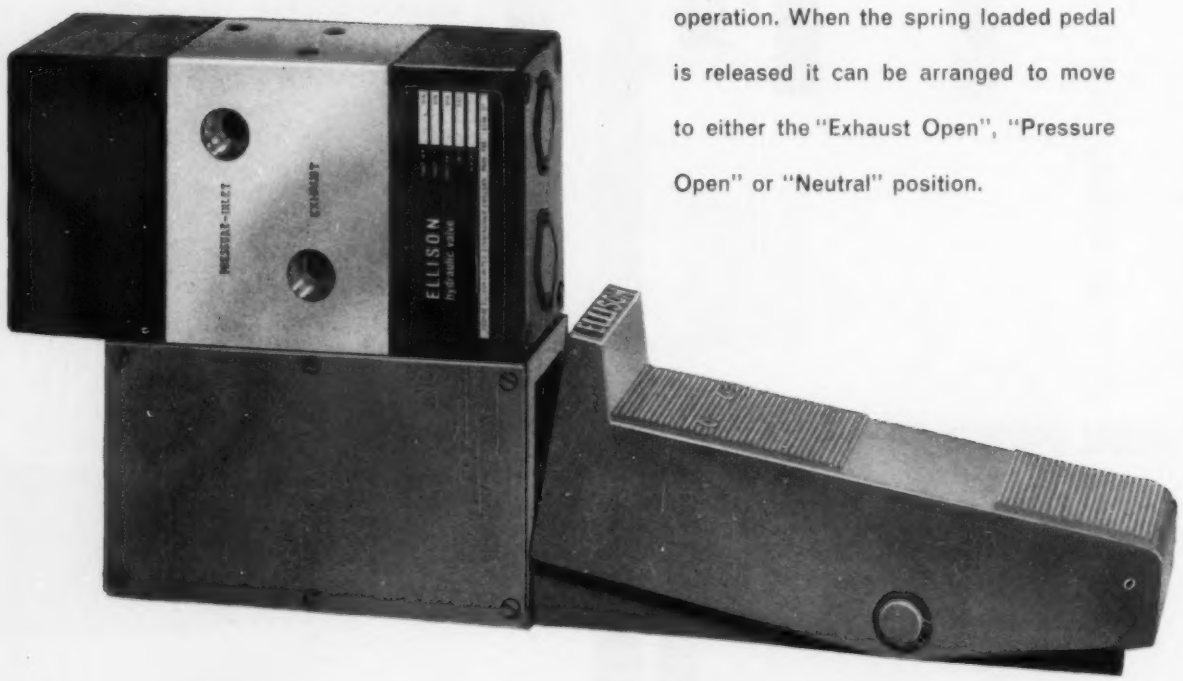

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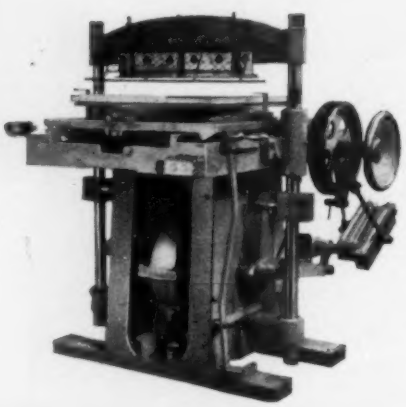

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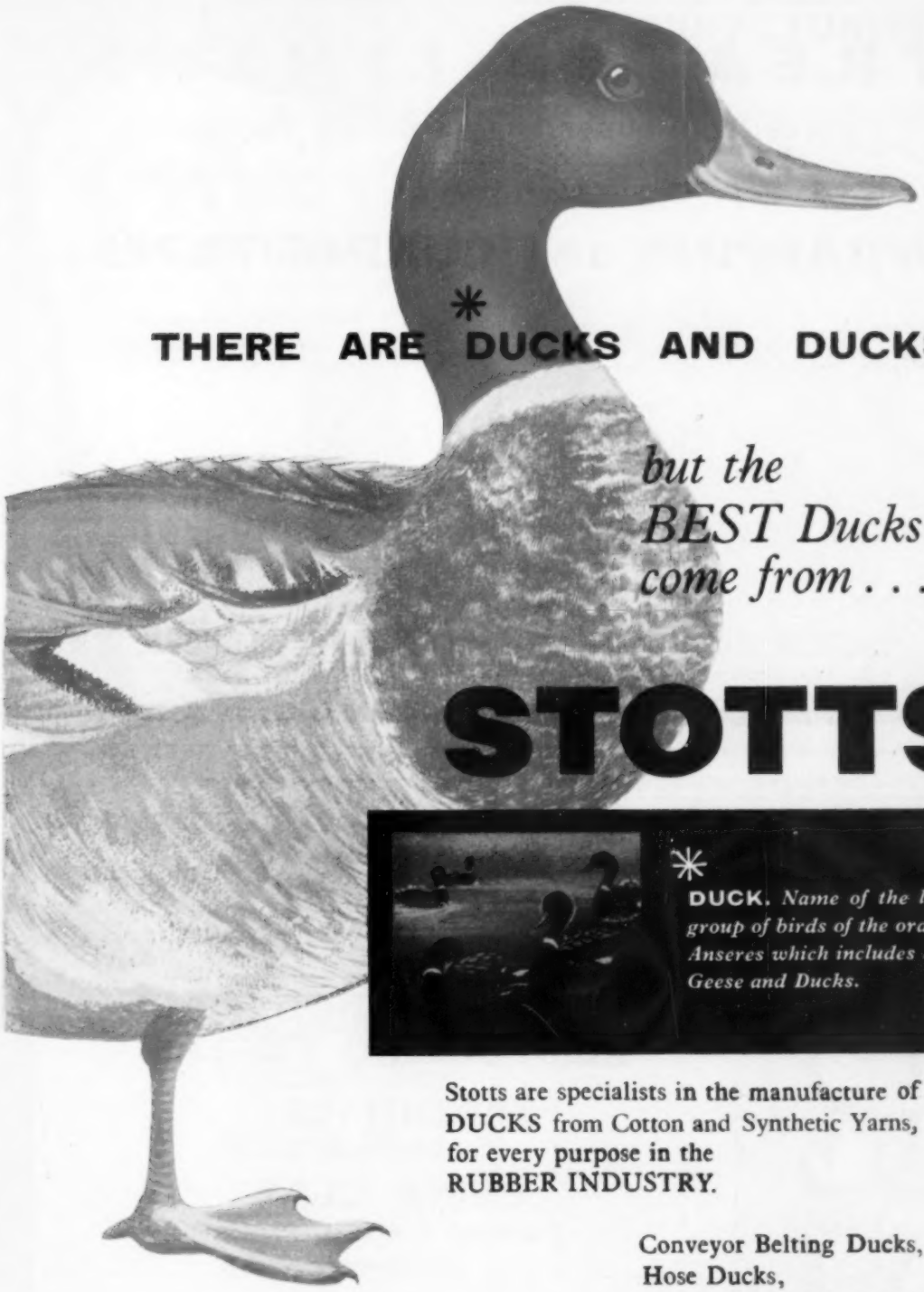

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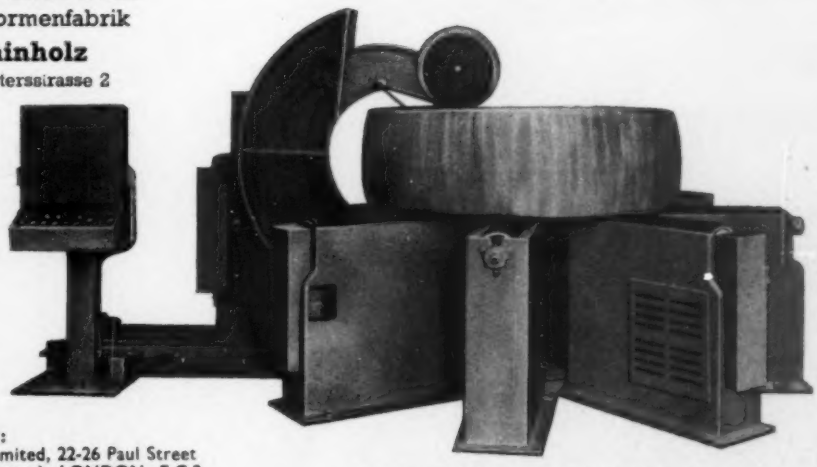

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IN ITS 76th YEAR

July 9 1960

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NOTES of the WEEK

Advance of Synthetic

ANOTHER landmark in the advance of synthetic rubber has been reached by the opening of the new Shell SBR plant in Holland (reported elsewhere in this issue). In a speech at the opening ceremony, Mr L. Schepers, managing director of Royal Dutch Petroleum Co., estimated that in five years time annual world requirements of synthetic rubber will top the two-million-ton mark. There can be little doubt that this is no over-estimate. Synthetic rubber production for this year—excluding the Soviet bloc—is estimated by the Natural Rubber Bureau to reach 1,810,000 long tons, with natural production totalling 2,135,000 long tons. Preliminary figures from the International Rubber Study Group for April last give world production of natural at 152,000 tons and of synthetic at 157,000 tons. Both were down on the March figures which were, respectively, 157,500 and 165,000 tons. On this showing, synthetic is approaching the natural figure rather faster than anticipated.

More and More Polythene

THE announcement this week that I.C.I. is to invest £5¾m. in a polythene plant in Argentina, with an initial capacity of 10,000 tons a year (see *RJIP*, May 21 1960), is just another reminder of the ever-increasing world production capacity of this material. In fact, few weeks go by without similar statements. Most recent include the Union Carbide plans to erect a plant in Puerto Rico with a 110m. lb. capacity and the start in Israel of a $5m. polythene plant. The world-wide spread of plants for the manufacture of other plastics materials continues unabated.

Writing Letters

THE finer points of letter writing, which, it must be confessed, are not as widely appreciated as they should be, are outlined effectively and sometimes amusingly in the recently issued 5th edition of a booklet published by the British Association for Commercial and Industrial Education. The booklet stresses that in correspondence 'English' should be used rather than 'Business English'. It may seem almost incredible to some that antique and awful phrases like 'Awaiting the favour of your esteemed command', and 'Trusting this matter will have the attention of your good selves' are still in use. But it is a fact. The formerly favoured Ult; Inst; and Prox; have, thank goodness, more or less had their day but one can still read museum phrases as 'Yours to hand', or 'Adverting to your favour of'. However, the most interesting—and certainly chastening—thing to be gleaned from the booklet is that one is oneself occasionally guilty of perpetrating some of the grammatical horrors described. It is, of course, always the other chap who gives the impression that his company has a machine automatically grinding out a mixture of jargon and gibberish in which is somewhere concealed the message to be conveyed. The booklet is available from the BACIE, price 3s., from 26a Buckingham Palace Road, London, S.W.1.

The 'Dip Tech.'

THE popularity among students of the recently instituted Diploma in Technology is shown by figures contained in the report published on June 24 of the National Council for Technological Awards. Nearly 4,000 students have been enrolled, with the number attending first year courses, at 1,558, well above last year's 1,171. The Council have always regarded the 'Diploma' course as a complete entity, the industrial training being just as much a part of the course as the academic study. A memorandum in the report defines the responsibilities of firms providing industrial training and of colleges which the students attend, and outlines particular information about industrial training which will in future be required before they recognise a course.

On our home ground, the 1960/61 prospectus of the National College of Rubber Technology gives details of many courses available. The full-time Associateship courses in rubber technology and plastics technology respectively are growing, particularly at the post-graduate level, and the Ministry of Education is considering physical extension of the premises. Although the alternation of study and works experience has produced excellent results, 3,442 of the 4,000 students mentioned above are studying by this method, sandwich courses have been slower to develop at the College. The Head of the College spent some time in the USA last autumn studying the American counterpart—the widely adopted 'co-operative courses' exemplified in Cinncinnati University and the Northeastern University of Boston. These, too, have been highly successful. Of course, industry has to foot the bill but then, industry also gains.

NEWS *Briefs*

PLASTICS PIONEER IN SINGAPORE — BURMA TALKS WITH RUSSIA — RUSTYFA IN HUNGARY BIG CASEIN BUYS — BULGARIAN OUTPUT UP

●**United Kingdom** — Exports of rubber manufactures in May were nearly £200,000 more than in the corresponding month of 1959. Exports of belting amounted to £303,928 (£287,511) and footwear £193,534 (£136,441). Total exports of rubber manufactures for the first five months of this year are worth £5,448,788—an increase of £700,000 over the 1959 figure.

●**Australia**—Imperial Chemical Industries of Australia and New Zealand has decided to abandon its proposal to build a pigments factory costing £A1.5m. at a site at Altone (Victoria).

●**United States**—Results of the first six months indicate that 1960 sales of passenger car, truck and tractor tyres will surpass 1959, according to Mr Earl B. Hathaway, vice-president of the Firestone Tyre and Rubber Company. New car tyre sales will be found to be up 9%, he said.

●**Singapore** — The Government has declared seven industries and certain attendant products pioneer or favoured industries. They include the plastics industry. Pioneer industries are exempted from tax for a period of five years from the day production begins.

●**United Kingdom** — Sales from the Board of Trade's stock of natural rubber in June totalled 13,302 tons, for delivery: spot, 17 tons; July delivery, 260 tons; August delivery, 6,305 tons; and September delivery, 6,720 tons. 38,995 tons of rubber remained available for sale on July 1. A considerable proportion of the rubber sold for delivery in August and September will be exported.

●**United States** — Seiberling Rubber Co. of Akron has announced that its plastics division is being expanded. Plan is to double the division's sales in the next three years.

●**India**—The possibilities of starting small-scale industries around the Bhilai steel project with a view to utilizing by-products, are now under survey by the Union Ministry of Commerce and Industry. Projects would include several in rubber and plastics. The works will eventually manufacture naphthalene, pitch and phenol.

●**Burma**—The Burmese-Soviet trade agreement which expired at the end of June has been extended for another year. The goods which Burma will supply to the Soviet Union under the agreement include rubber.

●**Argentine**—During last week there were unexpectedly large purchases of casein by European buyers. It is estimated that they placed orders for 800 to 900 tons.

●**Kenya**—A company has been formed to manufacture man-made fibres. A factory will be constructed near Mombasa and machinery installed will cost £1.25m. The plant is expected to be in full scale operation by the beginning of 1962.

●**Hungary** — The UK consortium Rustyfa is reported to be competing for a contract for a complete tyre producing plant. This is to be sited in Budapest and the contract is valued at about £2.5m. The plant will produce mainly tractor and lorry tyres.

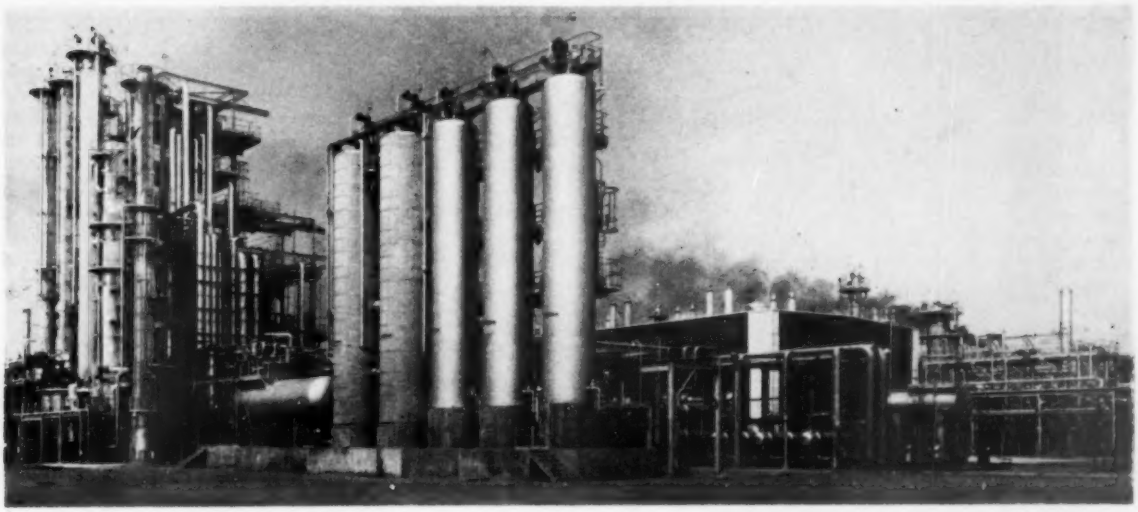
●**Yugoslavia**—A Zagreb plant which will produce polythene and polystyrene will come on stream in the middle of 1963, it is reported. Raw materials used will include natural gas obtained from the Klostar and Strzec oilfields. Some 15,000 tons each of polythene and polystyrene will be manufactured. Other products will include styrene monomer.

●**Nigeria**—The Nigerian Plastic Co. Ltd. of Ibadan has received an order for three and a half million beakers. This is the first big contract that the company has handled, and has been awarded by the Government. The beakers will be presented to schoolchildren on Nigeria's Independence Day, which will be October 1 this year.

●**Norway**—The Ministry of Commerce has announced that about 400 commodity groups have been placed on the Free List as from July 1, including rubber products such as floormats and sheets. The import value of the goods now freed amounted to approximately 200m. Norwegian crowns.

●**Bulgaria**—According to Bulgaria's Central Bureau of Statistics, output of the chemical and rubber industry increased 32.4% during the first quarter of this year, as compared to the first quarter of 1959.

'These rubber manufacturers seem to have a good case for putting their prices up'—492



Third Cracker on Stream Ahead of Schedule

BRITISH Hydrocarbon Chemicals third ethylene plant at Grangemouth has been completed ahead of schedule and the plant is already on stream. This is the biggest cracker of its kind outside the USA, and, with a capacity of 70,000 tons, it will more than double the output of BHC's previous two ethylene plants, which came into operation in 1951 and 1956.

The new cracker will feed derivative plants already at Grangemouth, and also three new plants which are associated with this increase in olefin output (*RJIP* March 26, 465). One of these units will more than double the existing capacity for butadiene. A second unit will produce methanol, which, via formaldehyde, will find its main outlet in synthetic resins.

Another plant at the Grangemouth complex which will take up some of the ethylene is the styrene plant of Forth Chemicals Ltd. (in which BHC is associated with Monsanto Chemicals Ltd.). This plant is being expanded for the third time since production commenced in 1953—its total output will be some 50,000 tons of monomer per annum by the end of this year.

Ethylene is also used by the Rigidex high-density polythene plant, which uses the Phillips' low-pressure process. This plant has a design capacity of 12,000 tons per annum.

British Hydrocarbon Chemicals—which is owned half by Distillers and half by British Petroleum—draws its main raw material from the nearby British Petroleum refinery. In the ethylene plants the petroleum distillate is cracked to yield ethylene and propylene. The propylene is reacted with benzene in the recently completed phenol plant at Grangemouth (*RJIP* April 2, 497) which uses the modern, continuous cumene process invented and developed by Distillers.

With all these additions—including the three new plants—the total investment by BHC at Grangemouth will amount to well over £35m., the works of the group occupying about 150 acres and providing direct employment for some 1,900 people.

Indian Black Plant

Phillips Carbon Black Ltd., a newly-formed joint venture of the Phillips Petroleum Corporation and Duncan Brothers and Co. Ltd. of Calcutta, India, is to construct a carbon black plant near Durgapur, India.

The plant will have an annual capacity of 22m. lb., Mr K. P. Goenka, chairman of the new company, has announced here. Most of the carbon black will be taken up by the tyre industry.

Phillips Carbon Black is owned 30% by Phillips Petroleum, 30% by Duncan Brothers and 40% by private investors. The plant is scheduled to begin production 'within months.' It will use a furnace process developed and licensed by Phillips, who is also participating in carbon black projects in France, South Africa and Italy.

I.C.I. Polythene Plant in Argentina

Industrias Quimicas Argentinas 'Duperial' S.A. — a subsidiary of I.C.I.—is to build a polythene plant in Argentina.

The plant, which will be financed by the parent company, will cost £5¼m. It will have an initial capacity of 10,000 tons per year and will be built on the outskirts of San Lorenzo.

Duperial will use the I.C.I. high-pressure polymerization process based on ethylene. The raw material will be obtained by cracking an indigenous light petroleum distillate. The high-pressure polythene process, which was discovered and developed by I.C.I., is now used in nine countries throughout the world—including India, Australia and Canada, where I.C.I. subsidiary companies operate large polythene plants.

News of this petrochemical project comes less than a year after I.C.I.'s announcement that Duperial was to spend £2.35m. on developing a new industrial site at San Lorenzo, 200 miles north of Buenos Aires. The investment will be subject to the usual approval by the appropriate UK authorities.

I.C.I. Plastics Exhibition Moves to Leningrad

FOLLOWING its very successful showing in Moscow in June, I.C.I. Plastics division's 'Plastics in Industry' exhibition opens in Leningrad on July 15. It is being held in the exhibition pavilion, Kirov Park, and will be open until July 29.

Included in the exhibits are a motor boat made from Alkathene, an Austin Seven saloon car showing the uses of plastics in the motor car industry, sections of a bathroom and kitchen featuring Perspex sanitary ware, and PVC flooring, large rigid PVC tubing and conveyor belting for foodstuffs and coal.

The Exhibition is designed, the company says, to provide an opportunity for their technologists to meet their opposite numbers in the Soviet plastics industry, to exchange ideas and to discuss the properties of plastics and methods of fabrication. I.C.I. is already selling polythene and PVC in Russia and hopes that the exhibition will stimulate trade in these and in new plastics materials.

Technical officers of the Plastics Division will deliver a series of lectures on materials and fabrication methods. There will also be a working demonstration of machinery employed in the plastics industry. Injection moulding and extrusion machines built by R. H. Windsor will produce finished articles and the Tetra-Pak—a polythene-coated paper package for milk, fruit juices and other liquids—will be demonstrated in a machine capable of turning out 5,400 Tetra-Paks an hour.

COMPOSITE PVC SHEETING

A new grade of PVC sheet has been developed by Bakelite Ltd., intended to meet the need of the chemical industry for a tough thermoplastic sheet having high impact strength and good chemical resistance for tank lining applications. This material is a composite sheet formed from equal proportions of Vybak industrial rigid sheet DVR 252 and industrial flexible sheet DVR 237, and is designated Vybak rigid/flexible combination sheet DVR 258. The flexible side gives added strength to the sheet and is more easily cemented to metal than rigid sheet, while the rigid side gives superior chemical resistance.

The composite sheet can be easily formed by heating above its softening point and cooling in contact with the desired contour, and can be welded by the hot gas welding technique. It can also be sawn, cut and drilled with conventional machines.

Vybak DVR 258 is available in sheets 96in. x 48in., and in thicknesses from $\frac{1}{16}$in. to $\frac{1}{4}$in., the finish on flexible side is matt and on the rigid side commercial bright. Adhesives recommended for bonding DVR 258 to itself or to other surfaces are Evo-stick SH64/1, Armstrong Cork adhesive W.420 or I.C.I. Tensol 50. Metal surfaces must be free from dirt and grease and should if possible be shot blasted and primed.

Aeropreen Expand

As part of an expansion programme to meet the demand for flexible polyurethane foams, Aeropreen Products, a subsidiary of Lewis and Peat, is to increase its factory space by 25%. There will be a corresponding increase in cutting plant in the fabricating department.

TURNER CHANGES

Turner and Newall has announced some changes in the boards of its subsidiaries. Mr N. A. Morling, a member of the parent board and chairman of Turner Bros. Asbestos Company, J. W. Roberts, and Glass Fabrics, has been appointed to the board of Ferodo.

Mr G. S. Sutcliffe, a member of the parent board and chairman of Ferodo, has been appointed to the boards of Turner Bros. Asbestos, J. W. Roberts, and Glass Fabrics.

Counter Attraction

Evergleam, a new polyvinyl chloride counter-topping material is being brought into the UK market by Goodyear. Available in four designs—linen, frost, metallic and terrazzo—and a total of 23 different patterns, Evergleam was recently developed by Goodyear in USA.

It is being supplied in 27in. and 36in. wide rolls, 38yd. long, and 45in. wide rolls 25yd. long.

Dunlop Record

A record in South Africa's industrial history has been set up by Dunlop. The company's Durban factory has completed three million manhours of work without any lost time through accidents.

C. C. Last

CYRIL C. LAST, founder chairman of the council of the Plastics Institute, died on July 2. He was 61.

He joined Bakelite in February 1927 and was appointed to the Board in 1951. After becoming sales director in 1955, ill-health caused him to retire in 1957, although he did continue to serve the company as a consultant.

C. C. LAST

He was founder chairman of the council of the Plastics Institute from 1931 to 1933, and founder president of the PI council from 1933 to 1934. He was also the founder of the Plastics Industry Golfing Society—popularly known as the PIGS—and member of the council of the British Plastics Moulders Trade Association from its foundation in 1930 until 1933, when it became the British Plastics Federation, of which he was a founder member.

He remained a member of the BPF Council until his death, served on the executive committee from 1950-1960, was vice-chairman 1954-1960 and chairman from 1956-1958. For two years, from 1951-1953, he was chairman of the Plastics Materials Manufacturers Group, and he was chairman of the Federation's publicity committee for fifteen years.

He was educated at St. Mary's School, Chelmsford, Regent Street Polytechnic and Sir John Cass Institute. He leaves a wife and a family of four.

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Part of the rubber complex at Pernis—the styrene plant

Synthetic Rubber at Pernis

£10m. SHELL SBR PLANT ON STREAM

OFFICIALLY opened on June 24, the new Shell SBR plant at Pernis, Rotterdam, is the first Shell plant for the manufacture of synthetic rubber to be located outside the USA. It occupies 42 acres (17 hectares), is designed for a production capacity of 60,000 tons a year and represents an investment of £10m. It is operated by Shell Nederland Chemische Fabrieken NV, whose premises form part of the vast 1,500 acre refinery and chemical complex, from which come the raw materials required for SBR.

This magnificent plant, first planned in 1957 by Bataafse Petroleum Maatschappij NV, one of the Royal Dutch/Shell Group, took one and a half million man-hours to build. It is a reminder that modern chemical complexes, with their towers and spires of gleaming steel, vast glass walled buildings, and the whole intricate associated systems of pipes, valves and control instruments, can well be regarded—from the point of view of craftsmanship—as today's counterpart of yesterday's cathedrals.

The 60,000 ton output is achieved with a total of 400 employees. The product, Shell 'Cariflex' SBR, comes for the present in the series S 1000, hot; S 1500, cold; and S 1700, oil-extended. The plant, ideally situated for the movement of the product by water, rail and road, is able to supply the SBR requirements of the Benelux countries and to export considerable quanties to other countries.

The new plant consists of a complex of three units, a butadiene plant, a styrene plant and a co-polymerization plant. Controlled from central panels, these units are almost completely automatic in operation.

Starting material for the preparation of styrene is ethyl benzene, obtained from the Shell Chemical Company's Carrington plant, which is converted to styrene by dehydrogenation. The process takes place at approximately 600°C. in the presence of large quantities of steam. The Shell 105 catalyst used, its action further promoted by a potassium salt, is a mixture of iron oxide and chromium oxide. It is self-regenerating and has a life of about two years. The raw dehydrogenated product consists of about 40% styrene. Unconverted ethyl benzene and other aromatics are separated off by distillation, the ethyl benzene being reconditioned for further use. The purified styrene, mixed with a polymerization inhibitor, is then stored until required.

Butadiene is prepared by the dehydrogenation of *n*-butylene using Shell 205 catalyst. The *n*-butylene is present in the gas obtained from both catalytic and thermal crackers on the Pernis site. For separation from the C_4 stream, the suitable part of the gas is subjected to extractive distillation with acetonitrile as the extractive solvent, a process developed by Shell in the USA. Dehydrogenation takes place with the aid of superheated steam at 600°C. and some excess pressure. Extractive distillation with acetonitrile is again used to separate unconverted *n*-butylene from the butadiene.

The co-polymerization unit is suitable for the production of both hot and cold SB rubbers. The former is prepared at 50°C. and the much more widely used cold rubber at 5°C. As well as the base materials, styrene and butadiene, the 20 or so chemicals involved include water, soap, an initiator to produce radicals and an activator to aid this process. Molecular weight, which might be described as 'tailoring' the molecules, is regulated by the addition of a modifier.

Each of the two reactor lines in the co-polymerization plant consists of ten reactor vessels and five displacement cylinders. Emulsification takes place automatically in the first reactor from which the mixture passes out to the second reactor and so on down the line. At the end of the line, the latex passes to the

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series of cylinders where the reaction is killed by the addition of a 'short stop.' Unconverted monomers are then recovered and to the stripped latex is added an antioxidant—and oil if an oil-extended SBR is required — and an acid coagulator, separation of the SBR taking place in a salt solution.

The coagulated rubber 'crumb' is then filtered, washed and dried in a travelling band drier. The rubber proceeds from this point on conveyor belts to four bale presses, manufactured by Planters Engineering Co. Ltd., where it is compressed into 75lb. (34kg.) bales. These are conveyed automatically to one of two packing stations where they are machine-wrapped in polythene. Alternative wrappings are polythene and paper bags or in paper bags after having been sprinkled with talcum powder. The bales are packed 15 at a time into one of two types of container. The first, non-returnable, is of wood and hardboard construction and is put together so that the cutting of two retaining steel bands causes the sides to fall outwards so that the bales may very easily be removed. The second is a British Railways returnable steel container, also easily opened. Both containers have built-in pallets to facilitate handling by forklift trucks.

One of the advantages of SBR synthesis is that by changing operating conditions, special types of rubber can be supplied to the processing industries, and in this connexion mention should be made of the tests and investigations made in the Royal Dutch/Shell Plastics Laboratory in Delft (Koninklijke/Shell Plastics Laboratorium Delft or KSPLD) where the applications of all types of SBR are studied. At Pernis, the product is controlled on solids content and Mooney figure. Physical tests are also carried out. Other synthetic rubbers are to be added to the production programme. These include polybutadiene and polyisoprene rubbers and, in fact, piles are already going in for the plant.

The control room of the copolymerization unit. The plant is almost completely automatic

The official opening of the plant was made by the Dutch Minister of Economic Affairs, Mr J. W. de Pous. In introducing him, Mr L. Schepers, managing director of the Royal Dutch Petroleum Company, referred to the unavoidable absence of Prince Bernhard of the Netherlands who was to have performed the ceremony. He went on to predict annual world requirements for synthetic rubber at well over two million tons in five years' time.

New Synthetic Latex

A synthetic rubber latex that can be used as a complete replacement for natural rubber in foam products is now being made by a new chemical process, according to the US Rubber Company.

Scientists of the Naugatuck chemical division of the company have developed a chemical method of converting standard synthetic latex with its relatively low rubber content, to the high solids latex needed in foam making.

A stable price, well below current natural latex levels, has been set for the new synthetic latex, a spokesman said.

Extensive tests and continuous actual foam production runs claimed to show that the new latex had high uniformity and foam made from it equalled natural foam in resilience, compression modulus and durability.

Fire at Catalin

The Catalin plastics factory at Waltham Abbey, Essex, was extensively damaged recently by fire which involved the moulding shop, a chemical store and an electrical store. No injuries were reported.

One man was killed and 27 men and women injured in a riot on June 27 on a rubber estate near Seremban, 42 miles south of Kuala Lumpur.

Part of the installation of Shell Nederland Raffinaderij NV and Shell Nederland Chemische Fabrieken NV at night

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OVERSEAS AGENTS THROUGHOUT THE WORLD

Sicherheits Schulter

DUNLOP'S NEW TYRE INCORPORATES SAFETY SHOULDER

A NEW tyre for fast cars is announced by Dunlop. The Road Speed RS5, with an entirely new safety shoulder and 3,000 knife cuts, is said to give exceptional steering precision and non-skid properties.

With the increasing refinement of modern fast cars a new problem has been appearing recently. It is a

Very tempting. The new tyre has been designed to meet the problem of 'wander'

form of 'wander,' and shows itself as a tendency for the car to lose steering precision in certain road conditions. It occurs when crossing longitudinal joints or ridges, when encountering a change of camber, or even when crossing a slightly ridged white line, in which case it is rather like 'tramlining.'

Tyre designers at Fort Dunlop, in collaboration with their counterparts at the Dunlop factory in Germany, have met the problem by introducing a special type of undercut rib on the shoulders of the tyre. Given the name 'Sicherheits Schulter' or 'safety shoulder,' it allows the tyre to ride up on a longitudinal ridge instead of being deflected by it, thereby restoring the tracking and steering accuracy that are needed for today's fast cars.

The shoulder consists of a rounded narrow zig-zag rib with closely spaced knife-cuts, supported by a zig-zag riding rib which is stepped down from the main tread. The riding rib is in turn supported by small diamond-shaped buttresses. The combination of a narrow shoulder rib and stepped down supporting rib, contributes considerably to the tracking qualities of the tyre.

New manufacturing techniques have made it possible for the first time to include a large number of knife cuts on the important centre rib, thus giving full traction right across the tread width.

An improved variable pitch pattern further reduces tyre noise. The high tenacity nylon casing gives strength and resistance to the high temperatures developed at sustained speeds of 120mph.

The tyre is now going in production and is expected to be available in a complete range for all high performance sports cars later in the year.

Rigidex Resists Detergents

DETAILS have recently been published by British Resin Products Ltd. of long term tests carried out to demonstrate the resistance of three types of Rigidex high density polythene, in the form of blown containers, to various detergents.

The samples were tested in five different detergents, under normal storage conditions at room temperature, and under accelerated conditions at 70°C. The types of Rigidex tested were 2 and 9 which are both homopolymers of ethylene having low melt indices, designed for extrusion and bottle blowing, and type 3 which is a copolymer of ethylene and higher olefins. This has a lower softening point than the homopolymers but far greater resistance to stress cracking.

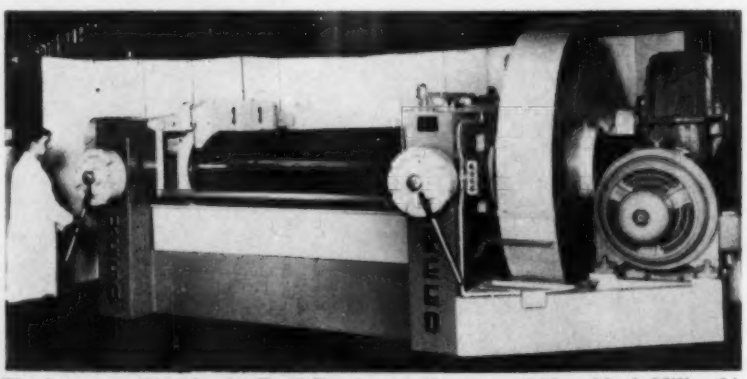
The tests, which lasted for up to nine months, showed that for maximum resistance to cracking, the copolymer type 3 should be used. Failure under normal storage conditions using bottles made of this material is remote. Another interesting point is that the provision of a vented stopper, where this is practicable, is shown to be a very effective means of reducing the risk of cracking, by preventing the build-up of internal pressures. This method is effective over a wide range of temperatures and using both homopolymers and copolymers.

Big Promotion for Gold Seal

This month EKCO Plastics start their biggest ever sales promotion drive for Gold Seal nurseryware. Advertising in specialist baby magazines will be supported by spots in TV magazine programmes and by a variety of sales aids and literature.

The range includes tableware, a nursery bucket and the EKCO Superbath. Moulded in polythene, this won the Council of Industrial Design award in 1958.

Sir James Mitchell has been appointed chairman of Sandac Rubber Estates. He replaces Mr H. W. Horner who has resigned from the Board in order to reduce his business activities. Mr J. Sands has been appointed a director in place of Mr Horner.



The latest machine in the Reed Brothers Ltd. range of Monoblock Mills, this 84in. x 26in. single-geared mill has drilled rolls for accurate control of temperature, is provided with a 175-h.p. drive, with water-cooled gearbox and bearings and plug braking, and the whole mill is arranged on anti-vibration mountings. The Monoblock design provides for all-steel housings and bedplate in one heavy fabrication, giving a strong, rigid structure, and making for machining accuracy in manufacture

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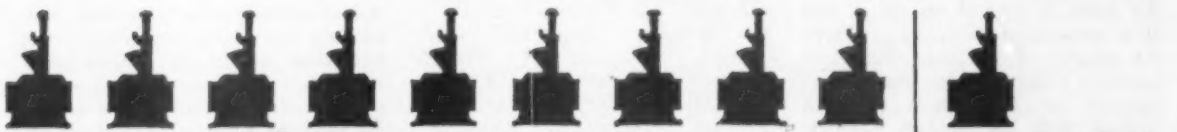

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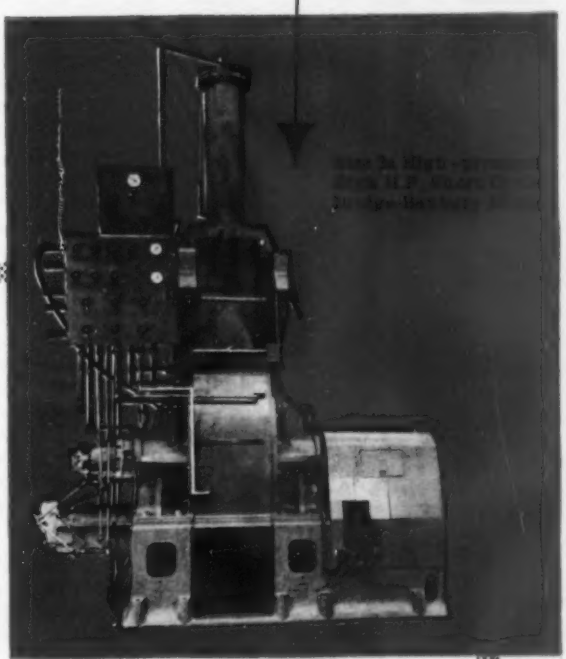

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The Organo Element Institute Moscow

PLASTICS-RUBBER RESEARCH IN THE SOVIET UNION

EDUCATIONAL and research work is carried out in Russia in a number of institutes. These are usually of a highly specialised nature. There are, for example, in Moscow at least three institutes dealing with the rubber industry. One deals with tyres, one with rubber generally, and another with mechanical goods. It is hoped to give an account of the work of these institutes in later issues. Similar conditions exist in chemistry, including polymer chemistry.

During the recent macro molecular conference in Moscow, a few visitors were able to visit the Institute of Organo Element Compounds. This institute, presided over by the well-known Professor Andrianov, is at present situated in an old building which previously housed the Institute of Organic Chemistry, but will shortly be moving into modern and more comfortable quarters. The institute was founded in 1954 to investigate the chemistry and applications of organic materials which besides carbon, hydrogen and nitrogen, contain other elements, particularly phosphorus, chlorine, silicon and metals. There is thus a difference between the work carried on in this institute and that of classified organic chemistry.

There are three divisions or departments dealing with Organo Elements, Compounds of high molecular weight and Physical methods of investigation. There is also a micro analytical section which serves all three departments. There is a large staff, and the total number of research workers is about 600. In section 1 organo metal compounds and phosphorus compounds in particular are under investigation and the chief researchers are A. H. Nesmiyanov and M. N. Kabatchnik (Metal Compounds), Dr Borisov (Stereo Chemistry), Academician Knushyanin (Fluorides), Academician Freugeuona (Synthesis) and Dr Anisimon (Carbonyls). The Heads of research in Section 2 are Academician Andrianov (Organo Silicon Compounds), Professor Borisov (High Molecular Weight Compounds), Professor Koleznikov (Carbon Chain Polymers) and Dr C. R. Rafficov (Unsaturated Compounds). Section 3, Physical Methods is in the charge of G. L. Sloninski together with Mr Kitaigorodski (Structural Analysis), Academician Obrieamova (Optical Methods) and T. T. Gellman (Micro Analysis). Other important research workers include D. N. Kursanov and B. B. Khorshak who was the main speaker to the visitors.

Polymer Combinations

The investigators are looking for a method by which polymers may be obtained directly from naphtha and similar materials. Most polymers at present are saturated compounds obtained by the polymerization of olefines, and these are originally made from saturated compounds. In theory, therefore, the intermediate stage (the unsaturated compound) serves no useful purpose. Efforts are therefore being made to polymerize many kinds of compounds. These are converted into free radicals, for example, by the use of peroxides, in particular tertiary butyl peroxides, as shown in Fig. 1.

$$[(CH_3)_2\text{—}CO\text{—}]\rightarrow \quad 2(CH_3)\text{—}CO^{\bullet}\rightarrow \quad CH_3\text{—}CO\text{—}CH_3 \;+\; CH_3^{\bullet}$$

Fig. 1

At 200°C., the two types of compound which are marked * are obtained as radicals. Peroxides are particularly useful, but other sources may be used. These radicals then react on the starting monomer according to the scheme shown in Fig. 2.

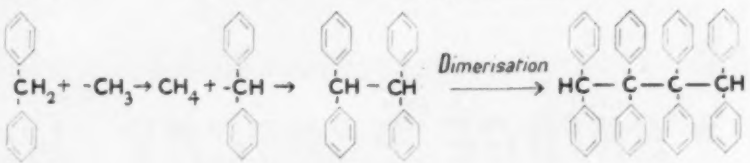

Fig. 2

Diphenyl methane polymers having an average molecular weight up to 900,000 have been obtained. The reaction is a recombination reaction of radicals formed from the monomers. The catalyst does not form part of the final polymer but is removed during the reactions. Any radical formed must be reactive and capable or recombining. An equivalent amount of peroxide must be used.

Influence of Structure of the Starting Monomer

The starting monomer must include two reactive hydrogen atoms, for example para di-isopropyl benzene gives a polymer having a molecular weight of 10,000, but the number of tertiary atoms is too few and this leads to branching three-dimensional polymers which are unsuitable. However, by using this method polymers can be obtained from compounds containing more than two tertiary hydrogen atoms, for example dichlor xylene and ferocene. Di-isopropyl diphenyl borazole does not give a high molecular weight polymer. Dichloromethane, which is typical of aliphatic halides, gives off both hydrogen and chlorine. A stable compound with hydrogen is necessary.

In reply to questions it was explained that the yield was dependent on the starting monomer. It was agreed that the amount of peroxide necessary was very high but the practical applications and use had not yet been reached. The visitors were shown samples of polymers obtained from benzyl benzoate, p-dichlorbenzene, diphenyl methane, and di-isopropyl benzene.

Another interesting polymer was one obtained from equal molecular weights of diphenyl methane and di-isopropyl benzene which had a molecular weight of 30,000. All the polymers are soluble in aromatic hydrocarbons.

Physical Properties

Some further details were given by Professor Znaninsky who had investigated the physical properties of the polymers. At the institute, the mechanical properties of polymers were investigated over the range —100°C. to +800°C. If a polymer seemed of special interest the dependence of mechanical properties on dynamic behaviour was specifically investigated, as also were the electrical and thermal properties. All polymers received some physical examination and those of special interest were investigated in more detail. Fundamental investigations to understand the structure of the polymers were also in progress, including the kinetics of crystallization, the packing of molecules and methods depending on osmosis.

Professor Andrianov dealt with grafts from metal organic compounds of which the chains readily formed cyclic compounds. The conversion of these cyclic compounds to polymers is being studied. The chain is broken by alkali or acid to introduce metals, and cyclic compounds of the type shown in Fig. 3 result.

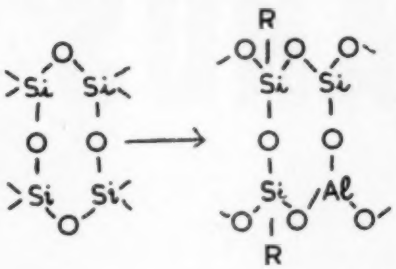

Fig. 3

Salts such as that shown in Fig. 4 enable aluminium, titanium and other metals to be included in the chain. A polymer of the type in Fig. 3 becomes insoluble only after heating to a temperature above 150°C.

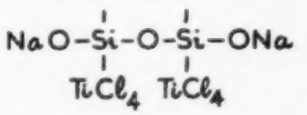

Fig. 4

Mechanical Properties of Polymers

The change in deformation with temperature shows a flatter curve (shown by the continuous line in Fig. 5) than that obtained with polymers from, for example, pentachlor diphenyl, which gives a normal flow (broken lines in Fig. 5). Polydimethyl siloxane on heating yields either a trimer or a tetramer.

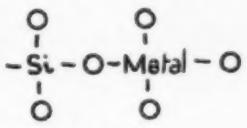

Fig. 5

Titanium, cobalt and nickel containing polymers have also been prepared. All are soluble but do not melt. They have a molecular weight of about 45,000. The viscosity of the solutions is very low. The molecules are threadlike and solutions of 80% solids can be obtained. In a structure such as that in Fig. 3 R decides the viscosity. Ethyl, for example, gives a greater viscosity than methyl. Polymers of this type are relatively stable, the stability being greater than that of the silicones. Thermal oxidation tests have been carried out and the results published. The possibility of obtaining block polymers is being studied.

In regard to applications, flexible polymers for the insulation of electrical wires are being made and samples of insulated wires were shown. Polymers were also being used as binders for the making of non - tracking electrical material which would withstand 6 hours at 300°C. and 4 hours at 420°C. These were moulded as for phenolic resins—about 40% of polymer was used with 60% of filler. A compound of the following type can be obtained in an elastic form,

O—Si—O—C—Si—O.

whilst in the formula in Fig. 6 the introduction of aluminium as the metal enables the polymer to withstand a temperature of 600°C.

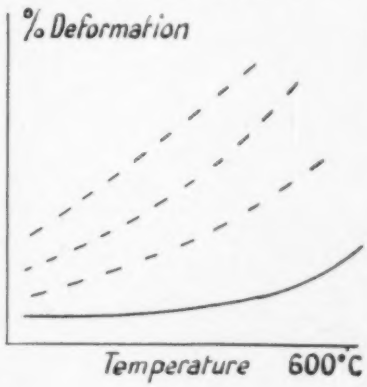

Fig. 6

The hydrolytic stability of such compounds should in theory be lower than that of the silicones, but in fact they have been found more stable to hydrochloric acid than clays. The remaining groups attracted the skeleton to the molecule. Titanium compounds are more stable than those from tin and aluminium, antimony and phosphorus gave stable compounds less readily hydrolized.

REINFORCED PVC SHEETING

Storeys of Lancaster have carried out extensive research over the last two years on the reinforcing of PVC sheeting to meet the requirements of a number of industries. PVC has been used for protective covering against rain, heat, wind or sea, against chemicals, manufacturing or processing hazards, and a new material announced by Storeys is expected to find markets for all such applications.

This new product is a range of materials known as Plastolene, which is a laminate of terylene fabric between two layers of flexible PVC sheet. The range is wide, for by using different formulations of PVC and incorporating different types of terylene fabric, the physical properties of the product can be varied to suit many requirements.

Among the variations already being tried are special low temperature grades, flame resistant materials, types with resistance to particular chemicals and a range of heavyweight laminates.

One large market for this product will undoubtedly be the protective clothing industry, particularly as the flexibility and extensibility of plastolene under even low rates of loading will allow 'give' in the right places in a made-up garment, which adds greatly to the comfort of the wearer. The fabric weave gives the material an attractive appearance, and distinctive designs and colours can readily be produced. Cleaning represents no problem as PVC is resistant to most staining materials and a damp cloth or warm soapy water are all that is required. The strength / weight ratio is good, thanks to the terylene reinforcement, the chemical resistance and ageing characteristics are excellent, and the material is very easily welded so fabrication also presents no difficulties.

Comfort for Nigeria

Bintex Ltd. have just completed and shipped nearly 300 5in. mattresses and De Luxe pillows for the Federal Palace Hotel in Lagos. This is scheduled to open for the independence celebrations in the Autumn.

KETJEN CARBON

A NEW INDUSTRY IN THE NETHERLANDS

The most recent inventions and experiences of Godfrey L. Cabot Inc., who supplied the know-how, and the Royal Sulphuric Acid Works Ketjen Ltd. have resulted in many new features in carbon black plant construction. Revolutionary for this industry is the abundant use of stainless steel whereby an end-product is obtained with extremely low grit content. The two units are equipped with ready to start spare engines and the power and steam required are generated in the plant, assuring continuous and uninterrupted operation so essential for uniform quality.

FROM THE COUNTRY OF THE BLACK KETJEN CARBON NOW SERVES THE RUBBER INDUSTRY.

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With this plant Ketjen Carbon Ltd. became a pioneer in an entirely new industry for the Netherlands. After a successful start-up on April 24, 1960, this 24.000 t/yr plant is now in production of

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while in the course of this summer two recently developed types

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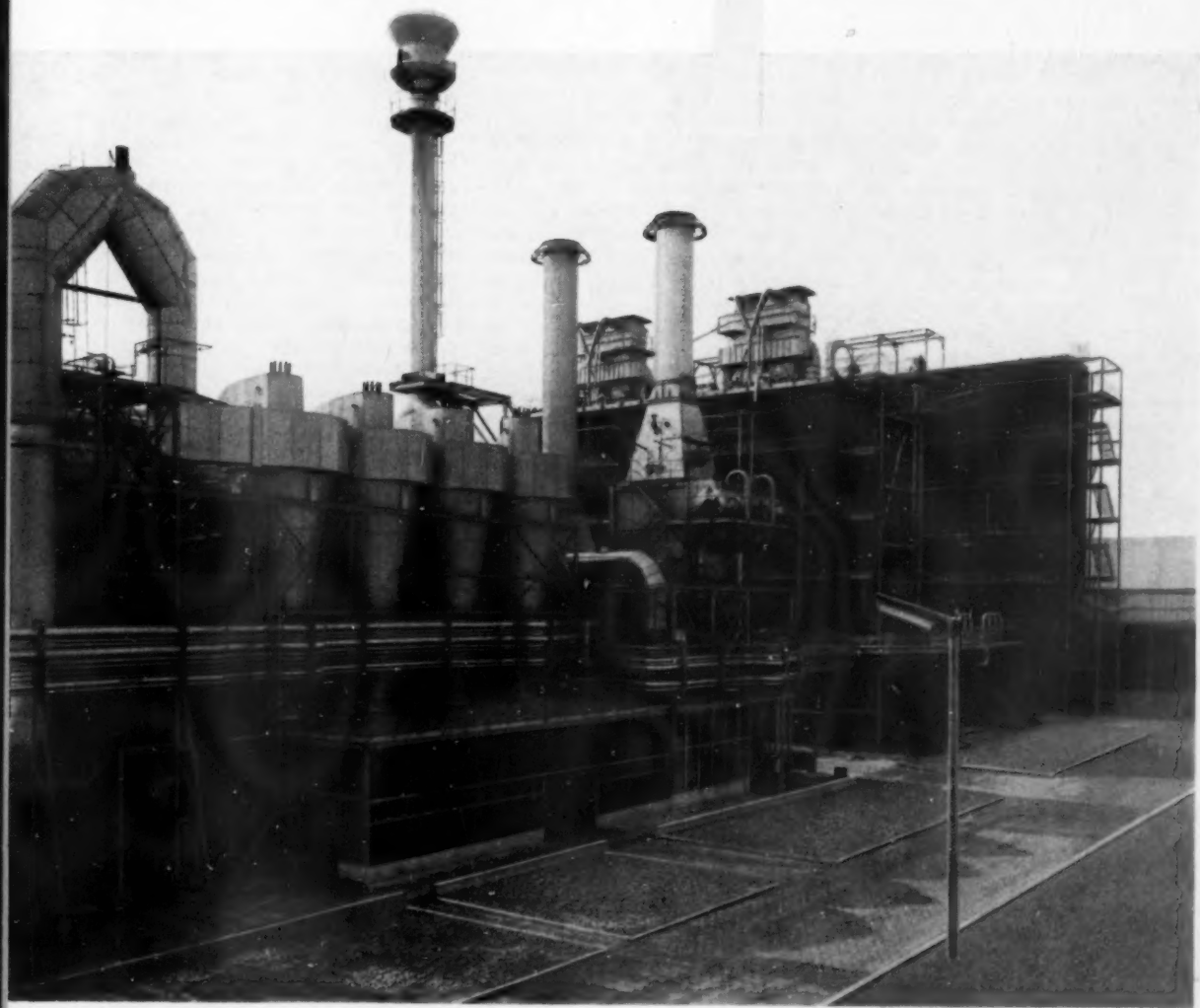

Fundamentals of Failure Phenomena

PAPERS FROM THE BRPRA SYMPOSIUM

RESULTS of some of the fundamental studies carried out recently by the British Rubber Producers' Research Association have an important bearing on practical problems which arise in the rubber industry. A symposium to bring these results directly to the attention of technical men in the industry in a personal manner rather than by published papers, took place on July 7 and 8 at the BRPRA laboratories at Welwyn Garden City.

The symposium, 'Fundamentals of Failure Phenomena in Rubbers,' opened with a paper read by Mr L. Mullins entiled 'Basic Factors Determining Tear Resistance.' Strength qualities were notoriously difficult to standardize and measure objectively, said Mr Mullins. To do this, it was clearly necessary to develop rational ideas of what tearing meant physically. A recent important advance had been to describe quantitatively the tear quality of a rubber in terms of a characteristic tearing energy which was related to the elastic energy stored in a highly strained zone at the tip of the growing tear. As the tear grew, most of this energy, which was many times larger than that required to form new surfaces, was dissipated irreversably as heat.

This tearing energy varied greatly with the type of rubber, the nature of the compound, and with the rate and temperature of tearing. The basic factors controlling this behaviour had been explored. It appeared that with gum vulcanizates which did not crystallize on stretching there was a simple relationship between tearing energy and hysteresis—rubbers with higher hysteresis possessing higher tear strength.

Theoretical Paradox

The effect of both crystallization and the presence of reinforcing fillers on strength provided an interesting theoretical paradox. It now appeared that the resultant increase in strength reflected the creation of dissipative processes which were essentially akin to increased hysteresis.

This essential inter - relation between hysteresis and strength provided an important determining feature in the design of rubbers for particular applications.

This was followed by a lecture called 'Rupture Processes During Cut-Growth and Flex-Cracking,' by A. G. Thomas, in which he said that the failure of rubber due to cut-growth or flex-cracking on repeated cyclic deformation was a special and important example of a tearing process. There was an important difference in behaviour of crystallizing and non-crystallizing rubbers. In simple tearing under a steady load, virtually no growth of a tear or cut occurred in a crystallizing rubber if the load was less than a certain critical value, but, under similar conditions with a non-crystallizing gum rubber the cut grew steadily with time. However, if the same load was repeatedly applied in a cyclic way, cut-growth occurred progressively in both types of rubber. This phenomenon had been examined in detail, and it had been found that both cut-growth and flex-cracking behaviour could be described in terms of a simple tearing process. In the case of flex-cracking the 'cut' grew from small flaws initially present in the rubber. The effect of such flaws on the apparent tensile strength of rubbers had also been established and the possibility of describing various rupture properties such as strength, tearing, cut - growth, flex-cracking, and fatigue in a unifying way was now apparent.

Cellular Rubbers

A further development had been the application of the tearing energy approach to some aspects of the rupture of cellular rubbers and a satisfactory explanation of the dependence of their strength on the strength of the rubber matrix and the poor size had been found.

The last lecture of the morning was 'Fatigue as a Cut - Growth Phenomenon,' given by P. B. Lindley.

The cyclic cut-growth rate of natural rubber vulcanizates could, he said, be predicted to be proportional to the square of the tearing energy at the tip of the cut. This relationship had been verified experimentally.

In simple extension, where the tearing energy was proportional to the length of the cut and the elastic strain energy in the bulk of the test-piece, the cut-growth relationship led to a simple expression for the fatigue life of tensile test pieces under repeated cyclic deformation. It had been shown that this expression was satisfactory for a wide range of natural formulations, including black - filled compounds, and that changes in the temperature and frequency of deformation produced relatively small variations in the fatigue life. Thus, under service conditions, the factors which seriously affected the fatigue life of any natural rubber compound were the magnitudes of the surface defects and the maximum elastic strain energy.

SBR Fatigue Behaviour

A marked difference to natural rubber had been observed in the fatigue behaviour of non-crystallizing SBR gum stock. This polymer had been found to have a frequency and temperature dependent cut-growth rate proportional to the fourth power of the tearing energy; in consequence its fatigue life was much more critically dependent on cut length, elastic strain energy, frequency and temperature than that of natural rubber.

The afternoon session opened with 'Stress Relaxation Studies of Oxidative Ageing,' by J. R. Dunn, who said that measurement of stress relaxation provided an accurate method for following changes in a vulcanizate network. The data was more directly connected with the molecular reactions taking place in the vulcanizate than was data obtained by conventional ageing measurements, and both the amount of scission and the amount of cross-linking occurring during ageing could be assessed.

Stress relaxation measurements had been used to study details of chain-breaking and chain-making reaction in vulcanizates, and to investigate the mode of action of antioxidants. As regards the first topic, it had been shown that, if purified by acetone extraction before and after vulcanization, 'sulphurless' vulcanizates including peroxide, radiation, and phenol-formaldehyde resin cross-linked natural rubber or synthetic cis-polyisoprene, and also

In this case, the thought that the solvent recovery unit installed a year or two ago has already covered its cost and is paying dividends. A Sutcliffe, Speakman recovery plant adsorbs by active carbon valuable solvents which would otherwise be lost by evaporation, and returns them for re-use over and over again. Substantial savings—delighted director.

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natural rubber cross-linked with tetramethylthiuram disulphide degraded autocatalytically by random scission of the polyisoprene chains. Sulphur-accelerator vulcanizates, on the other hand, did not degrade autocatalytically and scission appeared to be directed at the cross-link site, although the crosslinks themselves were not severed.

Stress relaxation measurements had shown that dithiocarbamates and certain similar compounds protected sulphurless vulcanizates against the action of heat and, in some cases, of light also. Sulphur-accelerator vulcanizates with equally high resistance to oxidative ageing had not yet been obtained, since these were not responsive to protection by dithiocarbamate. Excellent resistance to light ageing had also been shown to be exhibited by sulphurless vulcanizates containing antioxidant 2246 if a U.V. absorber was also present.

Powerful Protecting Agent

The first day's lecture finished with a paper on 'New Approaches to the Protection of NR Against Oxidative Ageing,' given by S. G. Fogg, who said that recognizing the continuing need to improve the heat resistance of general purpose rubbers, the compounding of natural rubbers from this point of view had been re-investigated in the light of more recent theoretical studies.

The starting point was the TMT-ZnO curing system, which had been used for many years in applications demanding heat resistance. The very good heat resistance of this stock was due to the presence of a powerful protecting agent formed during vulcanization. Further protection could be conferred by the use of selected antioxidants and by imidazole derivatives.

Protective measures effective in TMT sulphurless stocks could also be applied to vulcanizates cured with dicumyl peroxide; this latter type of vulcanizate was preferred where a high resistance to reversion and set was required (*e.g.* in steam hose).

The choice of filler, vulcanizing system, and protective agents would depend on the properties which it was most desirable to retain for a particular application, and different compounds had been developed for maximum retention of various properties or groups of properties. Additionally, it had been found possible to minimise various undesirable features of the thiuram disulphide curing system, *i.e.* blooming low curing rate. The performance of these compounds was such that natural rubber could be satisfactorily used for products operating in the temperature range 100-125°C.

The second day of the symposium commenced with 'The Mechanics of Ozone Cracking,' by A. N. Gent, who said that studies of the growth of single cracks in a thin rubber sheet exposed to ozone had revealed two characteristic factors governing ozone attack. They were: (i) a minimum or 'critical' state of strain necessary for crack growth to occur at all; and (ii) a well-defined rate of growth when the critical state was attained or exceeded.

The critical condition was found to be similar for all the polymers examined, and independent of the conditions of exposure; it appeared to reflect an energy requirement for growth of about 60 ergs/cm^2 of newly-formed surface. This low value was comparable to the surface free energies of simple liquids, and suggested that the critical state was that at which the *surface* energy necessary for crack growth was provided in the form of stored elastic energy.

The rate of crack growth was found to be dependent on the chemical nature of the polymer and on its internal viscosity. When the latter was adequately large the rate of crack growth was similar for a number of common polymers and directly proportional to the concentration of ozone. This state was only achieved for viscous polymers by plasticization or at elevated temperatures, but for the more mobile materials it obtained over a wide range of temperature and composition.

Two Parameters

The final talk which preceded lunch, and a tour of the laboratories, was by M. Braden and D. Barnard on 'Physical Aspects of Anti-Ozonant Functions.'

Two physical parameters characterized the cracking process: (1) a critical elastically stored energy necessary for crack initiation to occur; (2) a characteristic rate of crack growth.

A number of additives retarded the rate of crack growth of natural rubber, although the maximum retardation of rate yet observed was only threefold. As the rate of crack growth in the more ozone resistant polymers was at the most a tenth of that for natural rubber, the additives so far studied were not of great technical importance. Since the extent of effect of these chemicals on rate was largely independent of the amount added in excess of 1%, it seemed that their action was not simply 'scavenging' of ozone.

The most important class of practical antiozonants comprised the N. N′ di-alkyl-p-phenylenediamines. In contrast to the additives referred to above, these substances increased the critical energy necessary for crack initiation, the extent of the increase depending on the ozone concentration. There was an upper limit of ozone concentration, beyond which the anti-ozonant was relatively ineffective, this limit depending on the amount of anti-ozonant present. Provided this limit was not exceeded, the critical energy could be increased a 1,000-fold. Samples containing anti-ozonant and exposed to ozone at strains such that the enhanced critical energy was not exceeded appear to resist ozone almost indefinitely; if this critical value was exceeded, however, cracks grew almost as fast as in the unprotected vulcanizate.

Modern Views

The nature of the results, and a theoretical analysis of possible mechanisms, indicated that the scavenging of ozone by the anti-ozonant was not a tenable protective mechanism. Indeed, the tendency of the anti-ozonant to become ineffective at high ozone concentrations may reflect that direct action of ozone on the anti-ozonant may be an undesirable side effect. It was considered more likely that, since high critical energies for cracking were conferred, the anti-ozonant reduced the degree (as distinct from the rate) of breakdown of the rubber by ozone.

Modern views on the chemistry of the action of ozones with olefins indicate that fission was a normal and immediate consequence and did not arise merely as the result of the degradation of a primary ozonide. The possibility of the chemical intervention of an anti-ozonant in the fission process was discussed in the light of evidence at present available. It was shown on chemical grounds that simple scavenging of ozone was unlikely.

SIFAM Factory

Sifam Electrical Instrument Co. Ltd., of Torquay, are completing a new factory. It will employ approximately 275 people in the manufacture of one of this country's widest ranges of precision electrical measuring instruments.

The new development brings under one roof machine shops, plastic moulding, tool rooms and spray shops.

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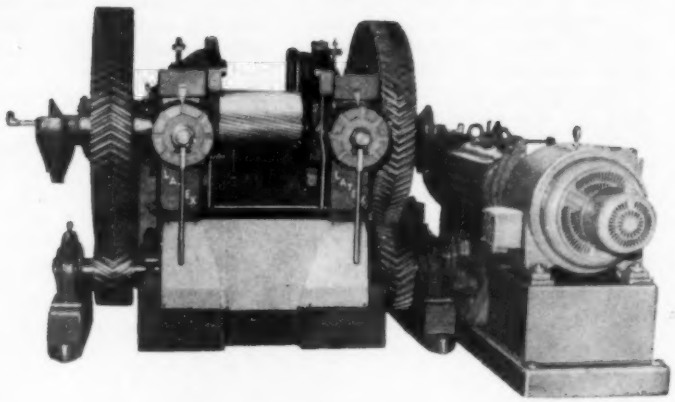

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Storeys New Department

CLOSER CO-OPERATION WITH CUSTOMERS

THE rapid advances in the utilization of PVC and other types of plastic sheeting by many industries, who are perhaps using it for the first time, has resulted in the need for closer co-operation between the manufacturer of the sheeting and his customer. In order to cope with the increasing demand for this service, Storeys of Lancaster has now formed a technical service department in Lancaster under S. D. Fenton, a chemist who has taken a leading part in developing many of Storeys vinyl based products.

S. D. FENTON

Mr Fenton was previously in charge of process and development in the plastic sheeting section—which means he is in a good position to assess the needs of a new product should it be considered necessary even when discussing an existing one.

This scheme was planned some time ago but was unable to operate fully because of the lack of suitable premises. The new department has been established at the Queens Mill site in Lancaster, and the laboratory, workshop and offices will occupy two floors.

While the main function is to assist customers, Storeys add that the staff will also investigate the technical problems of fresh uses for existing products and study the possibilities of further developments. In this respect it becomes a new link between the customer and Storeys laboratory.

Mr Fenton and his staff will be visiting customers in this country and overseas to investigate and assist in manufacturing problems in their own factories.

E. H. Champendale, special representative for taxi tyres in Pirelli's commercial tyre division, has died. Mr Champendale, who was 52, joined Pirelli Ltd. in 1931 as a representative in the general rubber goods department.

The ceilings of the service department are made of Varitiles and Plastolam (manufactured by British Plasterboard using Storeys' materials); the walls are covered in Storoflex 630 and the cupboards are faced and lined with Con-Tact

CORRESPONDENCE

Butyl Rubber

Sir,—On page 738 of your issue of *RJIP* dated May 14 you refer to the development of a new butyl tyre, and in your reference you say that raw material for this project is being supplied by The Polymer Corporation, Sarnia.

This statement has given rise to some anxiety on the part of several tyre manufacturers in this country who are at present experiencing production difficulties because of the short supply of Polysar Butyl. They had stated that supplies should not, in their opinion, be diverted to new projects while there is not sufficient material to meet the needs of established projects here.

We accordingly took this matter up with Sarnia who told us that while Polysar Butyl is eminently suited for the new butyl tyre it is not, in fact, being used in the present development, because of the critical supply position of our material. We learn that Enjay Butyl is being supplied on a special allocation.

The Polymer Corporation Ltd. wish us to confirm that the Canadian industry is on a strict butyl allocation, as are other territories, and that scheduled deliveries will continue to be made in accordance with such allocations.

We should accordingly be grateful if you would publish the above information in order to reassure UK consumers of Polysar Butyl that their supplies of this material are in no way being prejudiced by this new outlet for butyl rubber.

G. H. D. BLOUNT,
Secretary.
Polymer (United Kingdom) Ltd.

Botlek Black Plant

Sir,—We refer to your note headed 'June 11 at 10.12 a.m.' (June 25, 964).

As we are the sole distributors for the carbon black produced on behalf of the Continental Carbon Company at the three locations mentioned by you, we would like to draw your attention to a minor inaccuracy in your report.

It is true that the Continental-Columbian plant at Botlek, near Rotterdam, which came on stream on June 11, is a joint venture between the Continental Carbon Company and the Columbian Carbon Company. Similarly the plant at Trecate, near Milan, is a joint venture between these two concerns. The plant at Bordeaux, however, will be operated by the Compagnie Française de Carbon Black (COFRABLACK) and this represents a 50/50 joint venture between Continental and Phillips. Since Continental is interested in each of these plants, Witco Chemical Company Ltd. will distribute black from each of these three plants.

J. A. WHITE,
Director.
Witco Chemical Co. Ltd.

Ormskirk and district hospitals are using Fablon Top for lining three new electric ambulances.

MEN *and* MATTERS

A Review of People and Events

by Peter Richards

BUSINESS is booming at P. B. Cow—and this fact is reflected in the appointment, announced this week, of W. C. Jenvey to the board. He will take over the administrative side of the company, and will eventually move from Streatham to Slough, where the company recently acquired St. Helens Cable and Rubber (*RJIP* May 7, 692).

This acquisition means that P. B. Cow are by now probably the largest single tenant on the Slough Trading Estate. The factory area that has been taken over amounts to some 200,000 sq. ft. and will be used to expand the production of existing products and new interests. The latter include a tank-lining project which the company has also bought from St. Helens.

W. C. Jenvey

W. C. (Bill) Jenvey has seen a lot of the progress of this expanding company. He has been with P. B. Cow for twenty years, first joining as assistant secretary. He was appointed secretary in 1949, and is a director of several subsidiary companies, including London Moulders (Plastics) Ltd. Mr Jenvey likes a game of golf—he is a member of IRIGS—is married and has two sons.

A. B. Hudspeth, who has been Mr Jenvey's assistant for the past six years, has been appointed joint secretary.

Incidentally, as a result of the take-over of St. Helens from British Insulated Callender's Cables, P. B. Cow will now have a fresh field of operation—quite literally. The company will have its first sports ground at Stoke Poges which it will share with BICC.

FBRAM in Holland

Members of the Federation of British Rubber and Allied Manufacturers' Technical Committee last week spent two extremely interesting days in Holland as guests of the Shell Chemical Co. Ltd. It was not by a long way, however, a sightseeing trip and, I gather, time was found even for a meeting in a room kindly provided for the purpose in the Rubber Stichting building in Delft.

Along with other guests, the party was welcomed at the Rubber Stichting building, now used by Shell as part of the Plastics Research Laboratories, by Dr G. F. van der Bie. After an introductory talk, the visitors were shown the extent of the research carried out and the comprehensive machinery and apparatus employed. At the new Plastics Laboratories, Koninklijke/Shell Plastics Laboratorium Delft, to give it its full name, the party was welcomed by the manager, Dr J. Overhoff. This beautifully designed building, which incorporates an astonishing amount of plastics materials (it was described in *RJIP* November 21 1959), impressed everybody. Apart from the many excellently equipped laboratories, the wide range of commercially used processing machinery attracted most attention.

The high spot of the visit was undoubtedly the extensive tour on the second day of the new Shell synthetic rubber plant, officially opened only a day or two before, when guests were received by the management of Shell Nederland Chemische Fabrieken. After lectures on the chemical industry by Mr E. Meinsma, operations superintendent, and on synthetic rubber by Mr T. Risselada, assistant operations superintendent, chemical industry division, the party made their way in groups round the rubber complex. Throughout, I understand, Shell's well-known hospitality was in evidence. Mr C. R. Pinnell of the FBRAM Technical Committee, expressed the thanks of all the guests at the end of a successful and most enjoyable trip.

Shell personnel who shepherded the guests included: P. G. Croft-White, head, synthetic rubber section; F. Davies, rubber representative, Northern Sales Region; C. Duckworth, manager, Midland Sales Region; S. K. Garratt, manager, Public Relations Department; Jim Hartley, manager, Plastics Laboratory, Carrington, and P. W. Jacob, rubber representative, Southern Sales Region.

At The Ex

Canadians call it the 'Ex.' It covers 350 acres, stretches 1½ miles along the shore of Lake Ontario, and attracts three million people every year. It is the Canadian national exhibition, which opens next month.

This exhibition has become very much an international trade fair, and our own Council of Industrial Design is sending between 200 and 300 samples of Britain's best designed consumer goods to the UK stand. Many of these include rubber and plastics: armchairs designed by Charles Eames in glass reinforced polyester and made by Hille of London will be featured: some of these

Members of the FBRAM technical committee and other guests, including a party from Sweden, at the newly opened Shell synthetic rubber plant at Pernis, Rotterdam

chairs were seen at the Earl's Court furniture exhibition this year. Troughton and Young are sending a pendant light fitting, which incorporates a polystyrene diffuser, and Graceline Units a sink unit with a Formica surface.

I.C.I. (Hyde) Ltd. contribute samples of Vynair—PVC-coated cotton—and T. F. Firth a rubber/cotton furnishing fabric. The extent to which plastics have entered the toy market is shown by the fact that, out of 16 samples chosen, nine are in plastics. These include a miniature floral garden in polythene, toy soldiers and polystyrene costume dolls.

There was a time when plastics toys were labelled 'cheap'—meaning also nasty. But all these toys, like most of the other goods chosen for the exhibition, have been chosen from that modern arbiter of English taste, the Design Index.

Polythene Fire Fighter

In another part of Ontario plastics have more to do than be put on show. Canada's average forest fire loss over the past ten years has been about £4m. a year. In 1958 fire destroyed 4,939,000 acres of forest. Now polythene film is being used as one of many attempts to cut down fire loss.

Artificial ponds of water are being created in forest areas lacking a high water table or a ready supply of water for fire fighting. The key to their construction is a durable polythene film liner which eliminates loss of water that would normally seep through the soil. 0.2mm. Union Carbide black polythene film is being used, and the ponds promise to put a damper on at least some of these devastating fires.

News in Brief-Case

Bill Porter, manager of Goodyear's chemical division, is now in America, where he attended the Goodyear chemical division conference which was held at Akron (Ohio). I hear that the main discussion centred around the introduction of two new Goodyear chemicals—Adflex and Chemivic (types 400 and 800).

Adflex is the latest addition to the Goodyear range of synthetic rubbers. Chemivic 400, a general purpose polymer, is designed for moulding, extruding and calendering operations, and is said to be particularly well suited for the production of integral moulded shoe soles and a variety of mechanical goods.

Chemivic 800 is a speciality polymer developed for good performance in extruding and calendering operations, and the company recommend it for operations where low die swell and a minimum of mill shrinkage are required for quality end products.

It is expected that further news of these products, including estimated dates for their marketing in the UK, will be in Mr Porter's brief-case when he returns towards the end of the month.

EK Dies

People who have been in plastics a long time will be sorry to hear that Edgar K. Smith, a former Midland area sales manager of the moulding materials department of Bakelite, has died. He was 86. 'E.K.' joined Mouldensite Ltd. (one of the predecessors of Bakelite) in 1921 and served with the Bakelite organization until his retirement in 1943. He was one of the first members of the Plastics Institute and chairman of the Midland section in the second year of its existence.

* * *

Bootnote: The two sergeants who set up a new record for the San Francisco-New York walk last month got the boot as soon as they had finished. But it was a sweet one. Throughout the 3,022 mile walk they wore Commando soles and heels, made by ITS Rubber Ltd., a member of the Colston group. Sir Charles Colston presented the sergeants with cheques and a large cake — topped with a black icing replica of a Commando sole and heel.

* * *

Kenneth G. Hutchings has joined Palmer's Reinforced Plastics Ltd. Previously he was technical sales representative with Novadel Ltd.

* * *

Mr Eric Potter has been appointed chief accountant of Pirelli. He replaces Mr H. E. Addington, who has retired.

Question Corner—125

(Second Series)

450. What types of heat sealing machine are used for plastics film?

(Answer next week)

Answer to Question Corner—124

449. The abietic type acids in rosin, due to their conjugated unsaturation, oxidize quite readily, and when exposed to the air produce products of darker colour.

One of the methods for stabilizing rosin against oxidation is by disproportionation. The rosin is heated at 270°C. for a prolonged period in the presence of iodine, sulphur, mineral acids or certain chemicals. Part of the molecules give up a mole of hydrogen to form the aromatic and stable dehydroabietic acid; the hydrogen is absorbed by the other molecules to form the dihydro- and tetrahydroabietic acids.

Another method is to decrease the amount of unsaturation by hydrogenation. Either one or both bonds may be hydrogenated depending on the catalyst and solvent used. These products are used to modify alkyd resins and as tackifiers and plasticizers of both natural and synthetic elastomers.

Polymerizing rosin by the action of alkyl or metal halides at room temperature is a third method. After a prolonged period, a heterogenous mixture is formed which contains less abietic type acids and an increase of tetrahydroabietic acid. By hydrogenating slightly, or modifying with maleic anhydride, a product is obtained which is stable. It has a higher softening point and a higher solution viscosity than rosin.

(Another question next week)

Polly Ester Says . . .

'PIGS? That's some sort of committee my boss is always sitting on'

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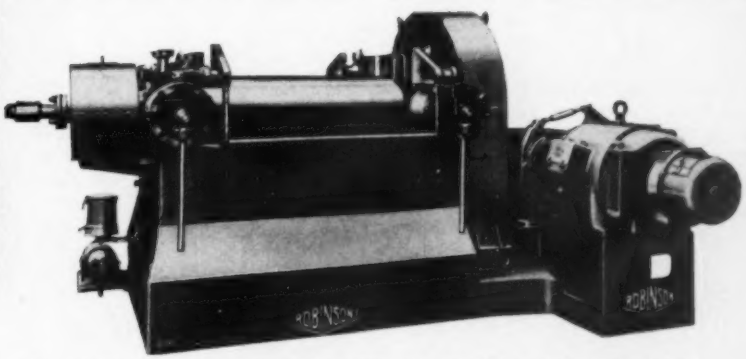

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Manchester Challenge Cup

THE Manchester IRIGS staged the Manchester Challenge Cup along with the Invitation Day at Prestbury Golf Club on Monday June 20 1960.

There was an excellent turn-out of 70 members and guests, and a glorious day for golf. The weather was very hot and the course is not an easy one, but despite this, some excellent scores were returned.

The cup was won by a comparatively new member to the Manchester section, S. K. Roberts, with a gross score of 79 less 9. Runner-up was C. T. Manson, whose score was gross 90, less 17.

Prestbury Golf Club provided an excellent dinner in the evening. S. Heywood, captain of the Manchester section, welcomed all the guests, following the presentation of the cup to Mr Roberts. He then distributed 24 additional prizes. Members and firms who gave prizes were: G. H. Robinson (Henry Gardner); T. A. Wilson (British Recovered Rubber); F. Haworth (Ferguson Shiers); L. R. Allanby (West and Senior); G. Betts (Travis Industries); B. J. Haill (Dunlop); T. R. Waring (I.C.I.); S. T. Diggle (W. T. Riley); H. West (West and Senior); S. Heywood (Alfred Smith); N. Liddiard (Hubron); C. T. Manson (Alfred Smith); G. C. Follett (Alfred Smith); S. Mouseley (Dunlop); H. K. Mills (Rubber Regenerating); E. Morris (Greengate and Irwell); and H. G. Redfern (Rubber Regenerating).—G. C. S.

PIGS at Swinley

The Plastics Industry Golfing Society Swinley Forest meeting was held on June 28.

The F. A. Hughes Trophy was won by J. R. Severn—81 (13): 68. Runner-up was R. P. Anderson—83 (13): 70. The Robert Hartley Prize was won by L. C. Pendry—92 (19): 73. Runner-up was G. R. Clarke—93 (18): 75.

The Cyril Last and Steuart Trophies, played for in the afternoon, were won by Percy Smith and F. Priestman: 44 points. Runners-up were G. Hall and R. J. Banks: 41 points.

The committee regret to hear of the death of the founder and life president of the Plastics Industry Golfing Society, Cyril Last, on July 20.—H. G. C.

IRIGS Wallwork Cup Competition

FRANKLIN TROPHY GOES TO SCOTLAND

THIS year the London section of the Institution of the Rubber Industry Golfing Society were hosts to the Manchester and Scottish sections for the Wallwork Cup weekend meeting (*RJIP*, June 4, 860). This was held at Aldeburgh Golf Club, Suffolk, on May 28, 29 and 30.

There were six members of the Scottish section present, and thirteen from London. In the intersectional matches London retained the Garner Trophy, beating Manchester by seven matches to one with four halved. In the Ryan trophy Scotland drew with Manchester three matches all. They also retained the Drumnadrochit Cup when they beat London. These results mean that the Franklin trophy for the team most successful in the sectional matches, went to Scotland. Scotland also took the Ferguson Trophy with 772 points.

Aldeburgh is a pleasant undulating course, about a mile from the sea. It is full of variety and is made difficult by large patches of impenetrable gorse almost bordering the fairways.

AGM Held

The annual general meeting of the IRIGS was held on the Sunday evening. The chair was taken by the senior vice-president, R. Ferguson. He expressed the deep regret of every member of the society at the death of the president, Howard Franklin.

R. Ferguson was elected president, Garth Swann was re-elected treasurer and secretary, and Eric Cheetham auditor.

On the Monday there was a strong breeze blowing and the weather was fine for the Wallwork Cup. At the end of the morning round, the leaders were Archie Bell (76—4) 72 and J. Gallie (90—18) 72. Third was L. MacQueen 74 and fourth place was shared by J. Ruffell and T. Davie with 76 net. In the afternoon L. MacQueen maintained his very good form and returned (74—4) 70 including a hole in one at the short fourth (130yd.), and this proved to be the winning score.

Second was Archie Bell with 146 net who, however, preferred to take the scratch prize, so the second place went to J. Gallie, third to E. Cheetham, fourth to D. Davies. Other prizes in the Wallwork Cup competition were: S. Diggle (2nd scratch prize); J. Ruffell (best 1st round); Tom Davey (2nd 1st round); F. L. Davies (best 2nd round); G. Redfern (next 2nd round); Fred Brown (long handicap prize), and Ken Mannock (endurance prize).

Running concurrently with the team matches, two Stableford competitions were held. Prizes for these competitions were: Single Stableford: 1st, Bill Alexander; 2nd, Stan Heywood; and 3rd, Mike Ferguson. Four Ball Stableford: 1st, Ian Ferguson and G. Betts; 2nd, L. Jennings and J. Dexter; and 3rd, R. Cuznor and R. N. Ferguson.

The Wallwork Cup dinner was held at the Wentworth Hotel on Monday evening, the chair being taken by the new president, whose health was proposed by the London captain D. Davies. In his speech Mr Ferguson thanked the London section for organizing such a successful weekend.

Prizes awarded during the weekend were contributed by: British Titan Products; Cabot Carbon; Davies Tyres Co.; Dunlop Sports; Expanded Rubber; I.C.I.; Kautex; London Rubber; Lintafoam; Monsanto; Mr A. Sanders; Oil Feed Engineering; Penfold; P. B. Cow; Rubber Regenerating; Slazengers; Whitehead Chemical; and Wilfrid Smith Ltd.

Scottish Section

IRIGS v. PIGS

The first of the two outings for the 'Dick Trophy' was played over the Paisley Golf Club course on Thursday June 16. The weather was ideal, although this exposed course had its usual strong breeze.

For a variety of reasons, IRIGS section could only muster six men and they were indebted to the PIGS for four players, two of whom were also members of the society, to make up the team. As the match finished 9—1 in favour of the IRIGS, we were doubly grateful to our guests for their assistance.—J. M. G.

WALLWORK GOLF

1. Fred Brown and Mike Ferguson. 2. Cup winner L. McQueen. 3. Jack Dexter and Archie Bell. 4. D. Davies and Ken Mannock. 5. I. Ferguson and W. Alexander. 6. Gordon Redfern and H. G. Redfern. 7. S. D. Wiggle and L. McQueen. 8. E. Cheetham. 9. E. Cheetham and E. Pilbrow. 10. A. R. Reid and W. Ayres. 11. John Gallie and Ron Ferguson. 12. Tom Davy and Brian Cuzner. 13. S. K. Roberts and J. Ruffell. 14. F. L. Davies and John Gallie

Rubber Statistics

MALAYA — UNITED KINGDOM

DETAILS of Malaya's ocean shipments and imports for the month of April have now been issued by Malaya House. The following tables summarize the information:

	Sheet and crepe	Latex
Ocean Shipments to:		
UK	9,144	2,835
USA	6,466	1,758
South Africa	1,620	119
Canada	1,931	—
India	1,630	3
Australia	2,346	663
Czechoslavakia	3,685	102
France	6,057	576
Western Germany	5,427	1,281
Italy	3,769	555
Netherlands	1,593	152
Poland	4,750	348
Spain	1,178	92
Sweden	1,099	188
USSR	5,670	—
Argentina	1,096	172
Brazil	1,827	—
China	3,045	—
Japan	4,973	1,205
Others	7,717	414
	75,023	10,463

		Total
Imports from:		
Indonesia:		
Borneo	8,928	
Sumatra	15,091	
Others	1,927	
		25,946
British Borneo		4,048
Thailand		2,752
Others		852
		33,598

Ocean shipments at 85,486 tons, brought the total for the first four months of the year to 368,095 tons. This represented a reduction of some 24,000 tons, or about 7% compared with the figure for the previous year. It included ocean shipments to the UK of 49,982 tons and to the United States of 48,570 tons. The total for Japan was 35,223 tons, while next in order of importance came Western Germany with 33,386 tons and France with 28,858 tons.

Imports of rubber to the end of April amounted to 158,985 tons, an increase of about 27,000 tons or some 20% compared with imports in 1959. Of the total amount, imports from Sumatra accounted for 78,482 tons, while those from Indonesian Borneo amounted to 33,071 tons.

United Kingdom

The Secretariat of the International Rubber Study Group has now published details of the UK rubber position up to the end of the first quarter of the year.

Imports of natural rubber during this period totalled 39,042 tons of crude and 9,214 tons of latex, or 48,256 tons in all, as compared with 53,306 tons during the first quarter of last year. On the other hand, during the first three months of 1960 there were deliveries from the Government stockpile totalling 21,159 tons. After allowing for exports, there remained a new supply of natural of 60,148 tons as against a new supply last year of 44,661 tons.

Consumption of natural rubber during this period amounted to 40,363 tons of crude and 6,027 tons of latex, making 46,390 tons in all as compared with last year's figure of 44,301 tons. Stocks of natural on hand at the end of March stood at 24,199 tons of crude and 5,997 tons of latex; stocks of crude had risen by nearly 9,000 tons from the figure of 15,470 tons at which they had stood at the beginning of the year.

Production of synthetic in the UK during the first quarter of the year amounted to 19,484 tons, and in addition there were imports of synthetic amounting to 19,075 tons. After allowing for exports, there remained a new supply of 34,701 tons, as compared with the 1959 figure for the first quarter of the year of 19,365 tons, thus representing an increase of some 15,000 tons. Consumption of synthetic also increased, from 18,240 tons to 27,411 tons, a rise of some 50%. Of this amount, 26,406 tons were in the form of dry rubber and 1,005 tons in the form of latex. Stocks of synthetic rose only slightly during the months under review, from 11,121 tons to 11,832 tons, though the former figure includes stocks held by importers, which is not the case for the stock figure at the end of March.

Reclaim rubber production during these months amounted to 12,053 tons, an increase of nearly 2,000 tons over the previous year, and after allowing for imports and exports, there remained a new supply of 9,138 tons as against the previous year's figure of 7,894 tons. Consumption of reclaim went up from 8,474 tons to 9,589 tons, and stocks of reclaim on hand at the end of the quarter stood at 2,429 tons, being practically unchanged compared with the position at the commencement of the year.

ANIC SBR

The price for Anic SBR 1502 was incorrectly quoted in Synthetic Rubber Prices (*RJIP* July 2, 34). The correct price is 22.25d./lb.

Agents are Hecht, Heyworth and Alcan Ltd., 3 Mincing Lane, London, E.C.3.

Mr C. W. Burton, Mr C. N. C. Meier, and Mr A. T. Roughton have been appointed directors of Phillips Rubber Soles.

Patent Specifications

The following information is prepared from published Patent Specifications by permission of the Controller of H.M. Stationery Office. The full Specifications can be obtained from the Patent Office, 25 Southampton Buildings, W.C.2, at 3s. 6d. per copy (including postage).

Preparation of Polymeric Mixtures and Compounds

No. 832,193. The British Rubber Producers' Research Association. Inventors: D. J. Angier, W. F. Watson and R. J. Ceresa. Application, November 9 1955 and May 7 1956. Filed, October 16 1956. Published, April 6 1960.

Polymeric materials are made by masticating a mixture of (a) a polymer which is not rubber-like at room temperature, (b) a polymerizable olefinic compound, and (c) if desired or necessary, a plasticizing solvent for the polymer. The constituents of the mixture and their relative proportions are such that the mixture is rubbery at the temperature of mastication, and generally it is desirable or essential to exclude oxygen during mastication. The process is an extension of that described in Specification No. 828,895 (*RJIP*, April 23 1960, 630) to polymers which are not rubber-like at room temperature.

Eighty-six examples are given of the preparation of the polymeric materials. The polymers used include polymethyl methacrylate, polystyrene, polyvinyl acetate, PVC, shellac, ethyl cellulose, epoxide resin, polythene and others. The polymerizable olefinic compounds used include methyl methacrylate, styrene, acrylonitrile, vinyl acetate and others.

PVC Compositions

No. 833,610. United States Rubber Co. Application and Filed, December 23 1957. Application in USA, March 6 1957. Published, April 27 1960.

Compositions comprise essentially three components, namely, PVC or a vinyl chloride copolymer, a monomeric alkyl ester of an alpha-unsaturated dicarboxylic acid and a monomeric vinyl aromatic compound. Such compositions are resistant to discoloration and loss of transparency when they are exposed to ionizing radiation. A preferred composition consists of 100 parts of PVC and 50 parts of a mixture of the other two ingredients, this mixture comprising 60% of a di-2-ethylhexyl maleate and 40% of styrene. Test results are given showing the improved resistance of the compositions of the invention to ionizing radiation compared with conventional PVC compositions.

Shorter Abstract

Vulcanizing Agents. 830,791. The Firestone Tire and Rubber Co. Filed, December 17 1956. — Hexathio-bis-secondary amines are claimed as vulcanizing agents for natural and synthetic rubber compositions which are vulcanizable by sulphur. The vulcanizing agents are used in the absence of free sulphur.

Rubber Markets

LONDON

After holding fairly steady, prices fell sharply during the early part of this week by over 2d. per lb. This mainly reflected a lower price trend in the East, but factory demand here remained small and rather selective, while Continental users were showing only modest scale-down interest for shipment parcels.

Latest prices are as follows:

No. 1 RSS Spot: 33¼d. nominal.

Settlement House:

August 32⅝d.-32⅞d.

September 32½d.-32⅝d.

October/December 32½d.-32⅝d.

January/March 32d.-32⅛d.

April/June 31⅝d.-31⅞d.

July/September 30⅞d.-31⅛d.

No. 1 RSS cif basis ports:

July 32⅝d.-32⅞d.

August 32⅝d.-32⅞d.

September 32⅝d.-32⅞d.

Godown:

July 111⅛ cents nominal.

LATEX

Centrifuged 60% latex per gallon in drums, seller, July, 18s. 5d., September, 19s. 5d., October, 19s. 3d., cif European ports. Spot, seller, 19s. 3d. Bulk, nominal, 18s. 7d. August d.w. Creamed, seller, not quoted. Normal, seller, July, 15s. 4d.

BANGKOK

No. 1 RSS

The price of No. 1 RSS at Bangkok on July 4 was 38.00 (38.25) US cents per lb.

SINGAPORE

Despite higher overseas advices the market opened very uncertain on July 4 and buyers were cautious. Prices eased throughout the morning under upcountry selling. Lower sheets were quiet. In the afternoon prices lost further ground under renewed selling but rallied slightly near the close. In afterhours trading the market was quiet.

	Malayan cents per lb. fob Malayan ports to open ports	
	July 4	Previous Close
No. 1 RSS, July	116½–116¾	119 –119¼
Aug.	116½–116¾	119¼–119½
No. 2 RSS, July	116 –116½	118¼–118⅝
No. 3 RSS, July	114 –114⅜	116¼–117
No. 4 RSS, July	112½–113⅜	115 –115½
No. 5 RSS, July	109½–109⅞	110 –111
No. 1 RSS, Spot	116⅜–116⅝	118⅛–119⅜
No. 3 blanket thick remilled crepe, July	108½–110½	110 –111
No. 1 fine pale crepe, July	123½–124½	126 –127
2X thin brown crepe, July	106 –106½	108 –109

Tone: Quiet.

The Industries Syndicate quote latex, native produce, 60% centrifugal, packed in rectangular drums, fob at 224d. per gallon.

CEYLON

No. 1 RSS

The price of No. 1 RSS at Colombo on July 4 was 134 (138) Ceylon cents per lb.

NEW YORK

The New York rubber market ruled as under on July 5:

DEALERS' PRICES

	US cents per lb. ex-dock	
	July 5	Previous
No. 1 RSS, July ..	42⅜t	43½n
Aug. ..	40⅞n	41⅝a
No. 2 RSS, July ..	42½n	43½n
Aug. ..	40⅝n	41⅜a
No. 3 RSS, July ..	42½n	43n
Aug. ..	40⅜n	41⅛a
No. 1 RSS Spot ..		46½n
No. 3 amber blanket, crepe, Sept. ..	37⅛a	37⅜n
No. 1 latex thin crepe, July	42⅜n	43¼n
No. 1 latex thick crepe, July	42⅜n	43¼n

FUTURES—REX CONTRACT

	July 5	Prev. Close
July ..	44.00t	44.90b–44.29a
September	39.70b–39.65a	40.40b–40.45a
November	38.50t	39.20b–39.25a
January ..	37.50b–37.75a	38.40b–38.75a
March ..	37.20b–37.50a	38.05b–38.35a
May ..	36.90b–37.20a	37.70b–37.95a
July ..	36.60b–36.95a	37.35b–37.55a

Sales: 66. Tone: Easy.

Rubber futures were easier on July 5 on trade and commission house selling in moderate dealing. Futures continued easy late in the day under liquidation, the decline extending to about ⅜ of a cent to more than a cent per lb.

AMSTERDAM

The Amsterdam rubber market ruled as under on July 4:

	Guilders per kilo	
No. 1 RMA	July 4	Previous
July	3.37½	3.43
August	3.35	3.42
September	3.34½	3.41
July/September ..	3.35½	3.42
October	3.28½	3.32
November	3.27½	3.31

Sales: 90. Tendency: Quiet.

DJAKARTA

Ten tons of sheet No. 1 were sold at 38.50 rupiahs per kilo on July 4. The market closed very quiet. Buyers were outnumbered by sellers.

	Rupiahs per kilo	
	July 4	Prev.
Spot No. 1 Priok ..	37.50b	38.00b
Spot No. 2 Priok ..	37.60b	37.00b
Spot No. 3 Priok ..	33.75b	34.00n
No. 1 fine pale crepe, spot	37.50b	38.00b

Tone: Very quiet.

COMPANIES in the NEWS

Aeropreen Products

The 40th annual general meeting of Lewis and Peat Ltd., who control Aeropreen Products Ltd., will be held on July 27. The chairman, Mr Herbert Boyden, said in a circulated statement that Aeropreen had achieved, and continued to achieve, satisfactory results. The group profit for the year attributable to equity shareholders was £84,963. It was recommended that a final dividend of 15% on the ordinary and 'A' ordinary shares be paid making a total of 22½% for the year.

Hardman and Holden

The company benefited from the progressive increase in general industrial activity, and from an increase in sales of their newer products, said the chairman, Mr Kenneth Holden, in his statement to shareholders, with the result that a record turnover had been achieved. A final dividend of 15% less tax, making a total for the year of 20% less tax, was recommended.

It was proposed to capitalize £250,000 of the reserves and to increase the issued capital to £750,000 by the issue of 1,000,000 ordinary 5s. shares, credited as fully paid-up, to shareholders on a basis of one for every two 5s. stock units held on July 28.

Grangemouth Explosion

There was an explosion at the Union Carbide polythene plant at Grangemouth, early on July 7.

Gas discharging from a safety-valve ignited. Bakelite, sole selling agents for Union Carbide in the UK, report that no employees were evacuated; there were no casualties and no extensive damage. Production continues normally.

Intol Prices

To the list of Intol rubbers under the heading SBR Types in 'Synthetic Rubber Prices' (*RJIP* July 2, 34) should be added Intol 1509 and Intol 1570, both priced at 22.5d./lb.

Intol Latices obtained from the International Synthetic Rubber Co., Hythe, Southampton, are: M23B, R23 and F28, all priced at 22.25d./lb., and 62A at 27.0d./lb.

Factory shipments of footwear by Canada's rubber products industry increased in 1959 to 14,975,995 pairs valued at $32,057,593 from 13,566,936 pairs valued at $29,691,303 in 1958.

Texas-US Chemical Co. is moving its New York sales office to 9 Rockefeller Plaza.

Industry INTELLIGENCE

Technical Data

Polyurethane Foams

Technical Information Sheet Urethane PC/U.17, issued by Imperial Chemical Industries Ltd., Dyestuffs Division, gives details of tests carried out on flexible polyurethane foams to assess their suitability for packaging delicate articles. The tests consisted of simple drop-hammer experiments, the purpose being to discover the deceleration suffered by the hammer on impact, and the length of time during which this occurred. Three grades of foam were tested, and the results compared with those obtained with a natural rubber latex foam. These showed that the energy absorbed by natural rubber was, for very low stresses, greater than any of the synthetic examples, but that when the stress was higher the urethane samples were all superior to the natural.

Esso Butyl

Various aspects of Butyl Rubber Technology are discussed in Technical Information Sheets Nos. 29-32, issued by Esso Petroleum Company Ltd., Chemicals Department, 50 Stratton Street, London, W.1.

TIS 29. Nuclear Radiation Resistance of Butyl Rubber: Effect of Compounding. While Butyl is not among the generally accepted radiation resistant elastomers, it has a reasonable life at low flux levels, and because of its outstanding ozone resistance and low permeability to gases is used for handling radioactive materials. The effects of compounding variations on its resistance to Co^{60} are tabulated.

TIS 30. Butyl Tank Lining Adhesion. The fabrication of Butyl tank linings has in the past been hampered by the occurrence of splice porosity and blistering between liner and tank, but recent laboratory work has largely overcome these difficulties. Formulations are given of seaming cement and rubber-metal adhesives which have proved satisfactory.

TIS 31. Butyl Soling Compound. Butyl rubber has high resistance to slippage and the ability to absorb shock. Added to this, good weatherability, good colour and low price make butyl vulcanizates attractive to manufacturers of footwear. The information sheet gives a typical stock, physical properties and moulding conditions.

TIS 32. Low Cost RHW-RHH Butyl Insulation Compounds. The use of sulphur and sulphur-donor cure systems in insulation compounds to meet American RHW-RHH specifications permit a substantive saving in cost over conventional quinoid cures. Typical stocks and mixing procedures are given.

Publications

Carbon Black Abstracts

The latest issue of the quarterly publication of the Cabot Technical Information Service, Carbon Black Abstracts, covers the period January-March 1960, and gives 207 abstracts of new patent and other literature relating to the uses of carbon blacks. These are divided into four groups as follows: (1) Production and Processing; (2) Applications; (3) Fundamental Properties; (4) Economics, Statistics and News of the Industry.

Section (2) contains 149 abstracts, 105 relating to rubber blacks, 13 to blacks in plastics and resins, 13 to colour blacks, and the remainder to electrical, metallurgical and other uses of finely divided carbon.

This issue, Vol. 9 No. 1, is distributed in the UK by Cabot Carbon Ltd., 62 Brompton Road, London, S.W.3.

Butakon A

Imperial Chemical Industries Ltd., Plastics Division, Welwyn Garden City, have published a 25-page booklet on Butadiene copolymer rubbers for oil resistance. This gives the properties of Butakon A butadiene acrylonitrile copolymers, details of compounding and processing them, and properties of typical Butakon A compounds for special applications. These include extrusion stock, an oil seal compound, general-purpose moulding compositions, petrol hose, abrasion-resistant belt cover, hard rubber, oil-resistant shoe sole, weather-resistant tubing or extrusion, hard oil-resistant compound, white conveyor-belting cover, and rubber parts for use with aviation fuel. From this list of possible uses of Butakon A it may be seen that the materials have a wide range of applications where resistance to oils, fuels and solvents is required and where natural rubber and general purpose synthetic rubbers are unsuitable.

Du Pont Elastomers

Elastomers notebook 1960/14 published by E. I. du Pont de Nemours and Co., describes properties and new applications of the company's neoprene, hypalon and viton elastomers. These include the use of neoprene hose in dust collection ducts by the Norton Company who manufacture abrasive compounds, Viton as a packing for swivel joints handling solvents, crude oil and petrol, and hypalon spray coatings used as linings for rail-road tank cars carrying strong solutions of caustic soda at temperatures as high as 140°C.

Also in this issue is the first of a series of articles to be published on the subject of simulated service tests. This should prove of interest and value to engineers who are in the process of developing such tests for their products, and will perhaps stimulate others to consider the desirability of developing similar tests, in place of standard laboratory tests which often bear little relation to actual performance conditions.

Machines, Materials and Equipment

Device to Prevent Falls

Increased safety for workers at high levels, or in other dangerous situations, is provided by a device which is used as a link between the worker's safety belt and a fixed anchorage. It contains 16ft. of steel rope wound on a spring loaded drum, and in normal use the rope is paid in and out automatically as the worker moves, to keep the line taut.

If the worker should fall, the sudden rapid pay-out of the cable causes internal ratchets to engage a locking ring which rotates against a braking device. This results in rapid deceleration, and the fall is checked within 12in.

A modified form of the device can be installed permanently on vertical ladderways, so that each man climbing the ladder attaches the harness at the bottom and discards it at the top, whence it can be hauled down by the next user.

Pneumatic Gauges for Tanks

In many industries a check must be kept on the level of liquid in storage or other tanks and vessels which are freely vented to the atmosphere. A gauge of new design for this purpose is not affected by changes in temperature. The unit for continuous indication can be either mounted on a wall or flush with the tank. It is connected by copper tubing to a standpipe, which is suspended vertically in the tank, the open end of which is higher than any expected level of sludge in the tank. All liquid is expelled from the standpipe by introducing compressed air into the system. Smaller dials on the panel show the air flow in the standpipe and the pressure of the incoming air supply.

This gauge has applications in industrial or chemical plants using a wide range of liquids, and also in water towers, dry docks, locks and weirs. Special gauges are available for use with very viscous liquids, such as paper stock or liquid glucose.

PATENT LIST

Printed copies of the Specifications in the following list, published by permission of the Controller of H.M. Stationery Office, can be obtained from the Patent Office, 25 Southampton Buildings, Chancery Lane, London, W.C.2, price 3s. 6d., including postage, but about six weeks after the date of this publication will usually elapse before they come available. Orders with remittance may be sent in advance to the Patent Office, and will be fulfilled immediately the Specifications are published.

COMPLETE SPECIFICATIONS ACCEPTED

Open to public inspection on July 7 1960

British Nylon Spinners Ltd. Process for crimping filaments. 839,393.

Firestone Tire and Rubber Co. Tubeless pneumatic tyre or other laminated article comprising a natural rubber layer bonded to a synthetic rubber layer. 839,394.

Du Pont de Nemours and Co., E. I. Coating of organic polymer substrates. 839,483.

Goodrich-Gulf Chemicals Inc. Polymerization of olefins. 839,398.

H. B. Park and M. Saslove. Apparatus for retreading tyres. 839,488.

Stamicarbon N.V. Process for purifying solid ethylene polymers. 839,489.

Boehme Fettchemie G.m.b.H. Process for the improvement of shaped products containing carbonamide groups. 839,891.

Kingsland Co. (Plastics) Ltd. Closet pan seats. 839,049.

Montecatini Soc. Generale per L'Industria Mineraria e Chimica. Polypropylene magnetic power magnetic recording materials. 839,701.

Imperial Chemical Industries, Ltd. Polyesters. 839,404.

Farbenfabriken Bayer A.G. Method for applying a layer of thermoplastic resin or thermoplastic material to the surface of a foamed plastics material. 839,657.

Package Machinery Co. Instrumentalities or elements for working thermoplastic materials. 839,364.

Berkeley Chemical Corporation. Preparation of organic dicarbamates. 839,408.

General Electric Co. Wrapping of solid bodies with polyolefins. 839,138.

Firestone Tire and Rubber Co. Apparatus for shaping and curing rubberized fabric articles. 839,445.

Bataafsche Petroleum Maatschappij N.V., D.E. Process for solidifying epoxy or phenolaldehyde resins. 839,584.

Esso Research and Engineering Co. Catalyzed halogenation of rubbery copolymers. 839,270.

Union Carbide Corporation. Reaction products of bis (2: 3-epoxycyclopentyl) ether with polycarboxylic acid anhydrides. 839,238.

Union Carbide Corporation. Reaction products of bis (2: 3-epoxycyclopentyl) ether with a polycarboxylic acid anhydride and a polyol. 839,239.

Union Carbide Corporation. Reaction products of bis (2: 3-epoxycyclopentyl) ether with a polyfunctional amino compound. 839,906.

National Petro-Chemicals Corporation. Stabilization of polyethylene during shutdown of moulding and extrusion apparatus. 839,907.

Goodrich-Gulf Chemicals Inc. Production of olefin polymers. 839,060.

Union Carbide Corporation. Reaction products of bis (2: 3-epoxycyclopentyl) ether with a polycarboxylic acid. 839,240.

L. T. Hing. Stopper for wide mouth vacuum bottles or vacum food jars. 839,590.

E. Biller. Process for the nuclear alkylation of aromatic compounds. 839,501.

Columbian Carbon Co. Carbon black. 839,918.

British Hydrocarbon Chemicals Ltd. Production of conjugated diolefins. 839,309.

Columbian Carbon Co. Carbon black beading process. 839,919.

Courtaulds Ltd. Production of artificial threads of polyacrylonitrile. 839,595.

Farbenfabriken Bayer A.G. Process for the vulcanization of rubber. 839,667.

Onderzoekingsinstituut Research N.V. Process for the preparation of solutions and powders of polymethylene terephthalates, as well as the artificially formed products manufactured therefrom. 839,791.

Changes of Name

Paper Cap Manufacturing Co. Ltd. (268,803). Great South West Road, Bedfont, Feltham, Mdx.—Name changed to Pioneer Plastic Containers Ltd.

Pioneer Plastic Containers Ltd. (574,837). Great South West Road, Bedfont, Feltham, Mdx.—Name changed to Paper Cap Manufacturing Co. Ltd.

Piccadilly (Kelani Valley, Ceylon) Rubber and Tea Estate (108,898). 99 Fenchurch Street, E.C.3.—Name changed to Piccadilly Estate and Securities Ltd.

R·J·I·P·

CLASSIFIED ADVERTISEMENTS

APPOINTMENTS VACANT

6d. a word, Minimum 10/-. Box 2/-.

ASSISTANT development chemist required by rubber manufacturers in Manchester area. L.I.R.I. qualification preferred. Work will cover a variety of engineering products in the rubber and plastics field. Excellent opportunities for advancement for an energetic man.—Write giving details of education, qualifications, age and experience, to Box 391. (391)

ASSISTANT to manager required. Rubber flooring factory that is situated near London. Applicant must have had previous experience in rubber flooring manufacture. The position is permanent and pensionable and the company is an old established one. Please write in first instance stating age, experience and present salary. All replies will be treated in the strictest confidence.—Box 376. (376)

DEVELOPMENT chemist required by rubber and plastics manufacturers in Manchester area. Age under 30 with A.I.R.I. or A.N.C.R.T. qualification. Previous industrial experience is not essential. Work will cover development in many fields of rubber and plastics products, the object being to encourage the widest possible knowledge of the Company's activities which is mainly concerned with service to the engineering industries. —Write giving details of education and qualifications etc., to Box 390. (390)

FIRST-CLASS chief engineer for large rubber company operating 2 plants in the South Midlands. Applicant must be able to prove first-class experience in installation and maintenance of all types of rubber machinery. A substantial salary will be paid to a man of 40-45 able to furnish proof of his ability to fill the position in an expanding organization.—Box 351. (351)

RUBBER Company, situated in South Wales, specialising in the manufacture of precision engineering components and high pressure hose, require two assistant chemists/technologists. It is anticipated that successful applicants will be 20/28 years old, educated to L.I.R.I. standard, possess a sound working knowledge of synthetic rubbers and be capable of working with the minimum of supervision.—Reply in confidence stating salary required to Box 375. (375)

APPOINTMENTS VACANT

EXPERIENCED RUBBER COMPOUNDER

for

EUROPEAN TECHNICAL SERVICE

with

IMPORTANT SUPPLIER TO THE RUBBER INDUSTRY

LOCATION: PARIS

Duties will involve visiting the rubber industry throughout Europe.

Residence term, 5 years

Special consideration will be given to applicants who have lived in Europe. Proficiency in languages desirable. A well-qualified person will have the opportunity to become Resident European Technical Service Manager after a trial period.

Apply to Box 389. (389)

DCL

THE DISTILLERS COMPANY LIMITED

PUBLICITY OFFICER

The Plastics Group of The Distillers Company Limited have a vacancy for a Publicity Officer at their London Head Office. The man appointed will be required to lead and coordinate the work of a team of publicity and advertising staff covering each of the various ranges of materials manufactured and marketed by the Group. He will be directly responsible to the Group Publicity and Information Manager.

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(continued)

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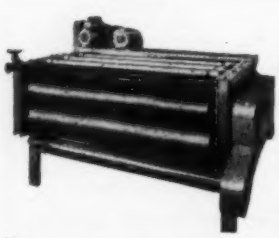

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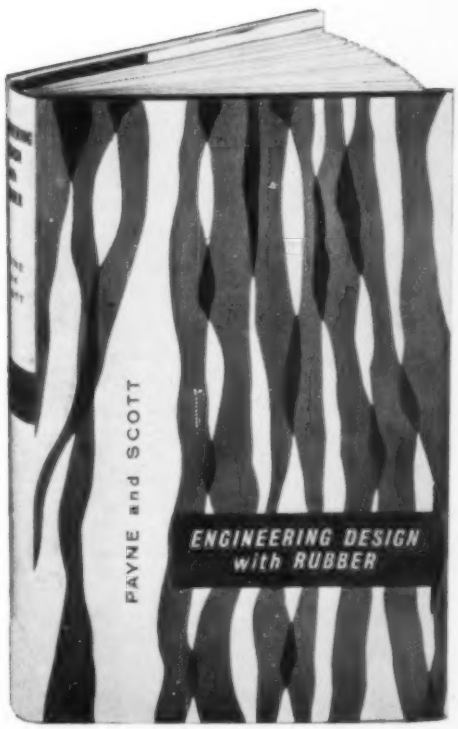

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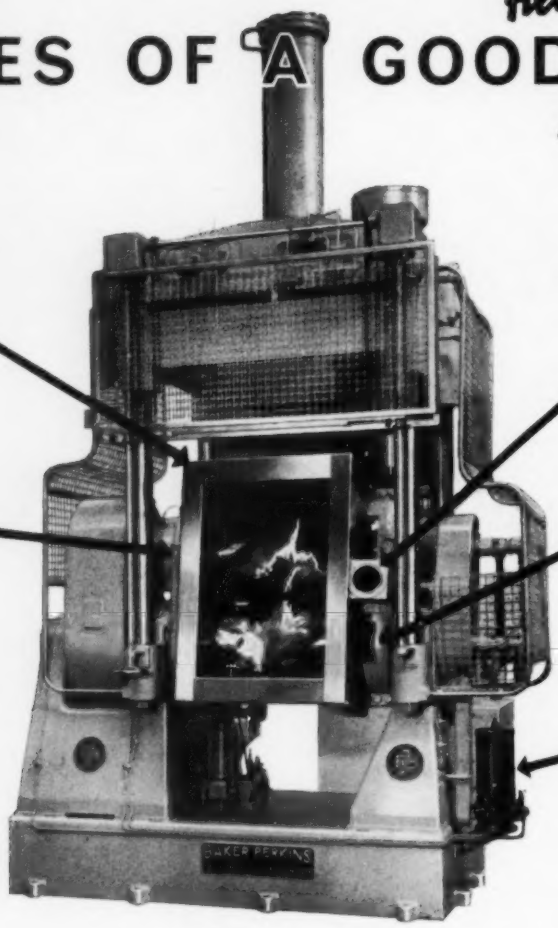

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